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EPA/NARSTO PM MEASUREMENT RESEARCH

WORKSHOP

"Breakout Group; Accountability"

July 22, 1998

MR. DEMERJIAN: I think we're going to probably get started. What we're going to do, hope to accomplish in this breakout session...what's our purpose here today, of course it's for you to comment on and reflect upon the write up on accountability that's in the content paper, as well as a series of follow up questions, in terms of if this concept is one that you think is usable to embrace, in terms of supporting PM2.5 activities and the super sites as potential source of augmenting those activities to meet this accountability paradigm. What exactly would we want to see happen, in terms of the design of those sites, their implementation, what they consider. One of the questions that, and so I had raised a series of questions to charge to the group, and actually John Bachmann is here and I guess I wanted to sort of nail him as the...I have to apologize. Let me tell you, these things look beautiful with a projector, a computer projector, but they're really kind of sad for this and I

apologize for them. They're really hard to read. But it's actually, the first question, John, that I was wondering about is whether in EPA strategic thinking, have they actually outlined, I realize that it may not be possible to do this in detail, but have they thought about what will be the major sources that they anticipate would have to be controlled, to deal with the relevant aspects of PM2.5. Because it seems that that's, in a sense, a bit of a starting point from where we might focus in on how to best handle this accountability exercise.

MR. BACHMANN: Well, first the idea of having four to seven areas be study areas or super sites, is predicated on our great tradition that there are probably at least that many different kinds of environments to be interested in, in the U.S. and if you can study particular places, then you hopefully apply your knowledge elsewhere. What Pradeep and Glen Cass put up is an example of different environments. The reason I'm saying all this now is that what strategies might be important, clearly are going to depend on where you are.

(**WHEREUPON**, there was a brief interruption.)

MR. DEMERJIAN: I'm sorry. Go ahead, John.

MR. BACHMANN: So, we have several kinds of environments and to me the kinds of

controls you were talking about are going to vary with the environment. You showed one of them already. It seems to me we have two phases. One is, we don't even start thinking about putting on controlled programs for fine particles until 2005 or so. So, it's kind of off in the future. So, what about between now and then? You already raised one of the big issues. How do we evaluate, how do we hold accountable programs which have been done for other reasons, sometimes related reasons, with respect to their impact on fine particle parts. When we evaluate the benefit of the acid rain program, we count the health benefits. We count the reductions in fine mass and sulfates when we look at that. We have the tools to do something about that. Therefore in the early stages, before we implement, for the purpose of fine particles, I would say that let's just make sure we take account of the kind of controls, the kind of changes we expect to see from implementation of the Clean Act Amendments in 1990 and the PM10 and the ozone program, things that are going on already. Number one is, we've already cleared up. What reduction do we expect in sulfur and therefore regional sulfur in, especially in the eastern part of the country. We know the hot spot of that has got to be in the Ohio River Valley and spreading out to all of the region. So, that's #1.

MR. DEMERJIAN: And we've got

Phase I already in place. Phase II is about to start.

MR. BACHMANN: Phase II, as you know, has already started in the sense that the goal of meeting all the introduction of 2000 has been anticipated by utilities who are making allowances to sell to others or to sell to themselves, so they don't have to do so much in the year 2000. So, instead of having everybody meet the 10 million ton production by the year 2000, they will meet that goal maybe 2015, as far as we can tell. But they'll have a lower emission level, in other words, we're already beginning to implement Phase II right now. And we want to see that, we want to see how that plays out in fine particles, acids and sulfur. And we expect one of the reasonable strategies to be put into place close to 2005 in the east, because it might benefit so many places, would be a tightening of that. That's a real possibility and therefore being in those places before and after fine particle standard really begins to be implemented is good for both of us.

MR. DEMERJIAN: Also within that program is a reduction, a measured reduction of NOX.

MR. BACHMANN: Absolutely. And of course ongoing, you know, proposed and nearly final is a massive, further massive reduction of NOX from utilities in the summertime anyway and non...

MR. DEMERJIAN: Is that in the

Phase II?

MR. BACHMANN: That is acid rain, that's the ozone program. That's the ozone SIP call in 22 states. So, in the 22 states, if we're in that part of the East, that's something to look at, that interaction between sulfur and nitrogen chemistry. So, that's obviously an interesting thing. What happens to ammonia, the other mega trends are. Ammonia increases in eastern North Carolina, in Holly Farms and some others and we don't know if we'll ever have to get to that stage where we go after Holly Farms, but nonetheless that's an issue to worry about in the east.

MR. DEMERJIAN: Are there any other regulatory actions that you would have implications on?

MR. BACHMANN: Yeah, it seems to me the programs instituted to reduce mobile source emissions of VOC and NOX are likely to have some influence and that's nationwide. We're still implementing the Tier I Standards of the 1990's emissions. They are not fully implemented. We're talking about, we already have a 49 state car that's tighter than that. Reformed gas is in a lot of places, but there are some who are arguing that we need to expand it. That's got to have some relationship to some part of organics.

MR. SOMERS: What happens on

mobile sources is that we've had regulations to control diesel particulate for a number of years, so that helps urban areas where you have high organic carbon constituents, the PM2.5. There's also been regulations, the diesel regulations are for heavy duty gasoline trucks, heavy duty diesel trucks rather. Light duty diesel trucks are a small part of the total diesel pie, but they have regulations, too. The big one is the heavy duty diesel, over 14,000 pounds gross vehicle weight. Non-road diesel particulate is another very big constituent and that's one that we haven't really paid any attention to until just fairly recently and it's one that in some of our regulations coming down the road will have controls on. We will, also, as you were saying, John, have controls on nitrogen oxides, they have already taken place on heavy diesel vehicles, which are a significant source of NOX, light duty gasoline vehicles are controlled. There's going to be a Tier II proposal for light duty gasoline vehicles out this December. We don't know what that's going to have in it, but it will be more controlled. And like you were, also, saying John, fuel controls of reformulated gasoline, and it's effects on NOX has resulted in sulfur reduction. As reformulated gasoline spreads out more and more...

MR. BACHMANN: Yeah, that's one of the in both the U.S. and Canada, that should be pretty

interesting when it finally happens in both places. In our case the proposal, my guess is Canada will be moving under it relatively soon. That'll be near the border to reduce this ultra content of the gasoline. The intent of that to help NOX catalysts and so forth, but that's got to have some other...

MR. DEMERJIAN: Can I ask a question about the diesel, heavy duty diesel particle reduction? When did that start to phase in and at what point would you, if we were to look at, or try to look for an incremental change in the impact of emissions from that control, over what period would we be looking?

MR. SOMERS: The first standard that really was stringent was 1988 for new heavy duty diesel engines and then that was tightened significantly in 1991. Again as all the EPA motor vehicle regulations it applied to vehicles that are produced from, engines produced from then on out there's not retrofit for what's already in the field. Through the 1988 standard, heavy duty diesel engines have a tremendously long vehicle miles travel before they're rebuilt, replaced at probably 600,000 miles. The average lifetime depends on their exact engine implication, six, seven years. The '88 standard would be seeing benefits already. At this point, from the '91 standard a little less so, but also very significant.

MR. BACHMANN: In other words you

might expect to see the maximum benefits of that in the next several...

MR. SOMERS: Probably about the year 2000.

MR. DEMERJIAN: What's the life cycle typically of those vehicles?

MR. SOMERS: Six or seven years. Some more, some less.

MR. DEMERJIAN: Can you give me a ballpark with how the numbers changed? What was the incremental change from '88 to '91?

MR. SOMERS: The 1988 standard was .6 grams per brake horsepower hour. In 1991 it was .25 grams per brake horsepower hour. Uncontrolled level is about one gram per brake horsepower hour. So, for brake controlled since 1991 there's been about a 75 percent reduction and there is also a further, stricter standard for buses. And that standard is .1 gram per brake horsepower hour, 90 percent reduction, went into effect in 1994.

MR. BACHMANN: The one place is doing it already, actually they're switching to gas buses, I understand.

MR. SOMERS: Yeah, that's a separate project. .1 gram per brake horsepower hour for diesel buses.

MR. DEMERJIAN: And that's

happening?

MR. SOMERS: Yes, it is. The switch is happening, but that's very, very mobile.

MR. BACHMANN: The other thing we've been very interested in looking for in those places, where that happens is a prediction based on what happened in Germany, by Oberdoerster, which was a possible increase in ultra fine particles at the same sign we see fine particles decrease. There's a surface area issue and so forth. Routine chemistry can get almost the things we've talked about up until now, but they aren't going to get ultra fines and that's a special attention to where you might see changes in ultra fines for some reason.

MR. SOMERS: What's happened or what may be happening, is buses or diesel engines are meeting stricter standards. So, under steady state conditions, for tailpipe emissions seem to produce more ultrafines than diesel engines not subject to that standard. But now what happens under other driving conditions, like transient operation we don't know. What happens in the ambient air to them we don't know. But the coordinating research council, requests from EPA and other agencies has funding for about a two million dollar project to the University of Minnesota to determine what is happening in the atmosphere concerning these diesel, these new diesel engines.

They're looking at areas that are highly impacted by diesels, trailers, buses, diesel trucks as they go down the road and doing more complicated engine dynometer testing and the transient conditions and other things.

MR. DEMERJIAN: Is anyone else introducing these buses besides New York City?

MR. BACHMANN: The New York City case is different. In New York City they're switching to gas. I haven't seen any evidence of whether, you know, whether the formation of ultra fine would be higher for gas engines.

MR. DEMERJIAN: Because there is that mass...

MR. BACHMANN: They're going to switch from a particle problem to a PFC problem.

MR. DEMERJIAN: Now did you say there's also a '98 standard? Did I hear you say that?

MR. SOMERS: '91 and '94 for diesel buses. There's a further standard for '98 and '99, in that time frame that tightens the diesel bus standard from .1, from .05 to .07 grams per brake horsepower hour. So, all these standards are coming into place and in time there will be more and more production set. What is not PM reduced, though, is the non road diesel, and non road diesel particulate is actually a bigger source of particulates....

MR. DEMERJIAN: Are there

estimates of the BMT of heavy duty vehicles?

MR. SOMERS: Yes.

MR. DEMERJIAN: Urban versus suburban and rural? I always have this feeling that heavy duty trucks are usually on the interstates. Is that true or is that just my...

MR. SOMERS: No, no, that is true. ...distributions for the heavy duty diesel trucks a percent of it is on the interstates or whatever and motor vehicles as a whole, rural and interstates is 30 to 40 percent. However, the diesel buses are 100 percent in urban areas. Even with things being on rural highways or whatever, and there's also a 10 percent that are...

MR. DEMERJIAN: And John the sulfur in fuel is going to happen, or is up for discussion?

MR. BACHMANN: Up for...

MR. SOMERS: Diesel fuel has been de-sulfurized tremendously.

MR. BACHMANN: I'm talking about gasoline, which is actually being proposed.

MR. SOMERS: As background diesel fuel has gone down from .2 percent to .05 percent sulfur. Gasoline has an a nationwide average at present day of .03 percent sulfur and some of the reformed... there's consideration being given to some regulations on gasoline sulfur. However, your all gas

selects from mobile sources is only about 3 or 4 percent total of your SOX. So, it's not like...

MR. DEMERJIAN: But it could happen.

MR. BACHMANN: It happens in the right place.

MR. SOMERS: If it happens in the right place, but you have the contributions of it's only 4 percent, but the advantage of the sulphur in gasoline, more than what it is now is for, it also seems to have a decrease in instantaneous emissions.

MR. BACHMANN: Now the rest of what to talk about is, we want to localize and of interest are particular areas that have ongoing programs. PM10 standard for example, Los Angeles would be the example, one that nobody mentioned in the room up until now, pacific northwest which has worry about wood smoke, has prescription fire as an issue and there are management programs, increased fire manager programs in that area, but also increased burning. So, there's some interesting things going there and I think...I see Cyril is here, there has to be other examples of state programs or things that happen locally but aren't necessary affected by some national thing, other than the standard itself.

MR. FEGLEY: There's also local things related to toxins.

MR. BACHMANN: I'm thinking the Missouri, charcoal chemicals, so you can expect to see peak level of PM10 which were 600 micrograms from here to here, down to much, much lower levels. So, there will be a few examples in places, some of them being like Los Angeles and some of the bigger cities in the pacific northwest, even before we get to...

MR. DURRENBERGER: We're probably going to have a whole fuel standard for the whole eastern two thirds of our state, probably going to reform gas, too. We're not sure that hasn't been tried, yet. But Stage I applied throughout the state.

MR. PIETARINEN: I was going to ask, because New Jersey is about to implement heavy duty diesel. It starts next year, and I don't know if there are many others that are doing that...

MR. SOMERS: There are some, but the benefit of that on particulates is still to be proven...

MR. DEMERJIAN: If I could follow up on that. By your implementing that, you're taking some benefit in terms of emission control. I don't know if it's on PM or something else. But whatever that is that you're taking, one of the things, if you believe in this process, one of the things that you should be able to do is to demonstrate that that has been effective to reduce the precursor that you claim is going to go down as a

result of this program. So, absolutely I am trying, and New York State is embarking on the program for its vehicles. I think what is it, 15 percent, reduction for doing that. I believe is the...

MR. BACHMANN: You're thinking the original 15 percent.

MR. DURRENBERGER: The first round.

MR. BACHMANN: You take credit towards that and you got an automatic credit which was something. I've forgotten what it was.

MR. DEMERJIAN: I think originally it was 15 percent.

MR. SOMERS: 10 or 15 percent.

MR. DEMERJIAN: But that didn't happen in New York State and now they're taking some intermediate type of... But I'm assuming it's tied to a number, right? You wouldn't do it without... Identifying what that number is and then demonstrating that it's applicable.

MR. SOMERS: Those benefits are for HCCO and NOX, since they're gasoline vehicles rather than particulates, and particulates there's no direct benefit, as such.

MR. DEMERJIAN: It does remain to be, I guess resolved, what portion of the organic combustion part of the internal gasoline combustion

engine is contributing to the semi-volatile portion of the organic.

MR. DURRENBERGER: One of the things I think you're saying is that what you have to do is if you say your controlled program is going to have some benefit in reducing precursory and the pollutant measures, in this case ozone, then you better be able to track the emission reductions that you have and see that you actually got the reduction you thought you were going to get, see if you can see that in the ambient data and see if the ozone in this case responds to that. So, there is the idea of tracking the emission reductions and then the air quality benefits from that.

MR. CHAPMAN: Health benefits, too?

MR. FEGLEY: I think we should step back and see what we're doing here. I'm a little confused. Is it that we are trying to see how we can use whatever monitoring is setup to be accountable to what the changes in standard are supposed to make, either max or these whole host of things we've just been talking about? Are we talking about how we can make sure that the network that we design or the super sites, whether satellites or whatever are accountable to the needs of health scientists and spirit scientists? There are lots of different levels of accountability.

MR. DEMERJIAN: Let me tell you the

level that I'm introducing here. It's one in which we have existing networks and those existing networks have certain objectives. One of the objectives that they have not been required to meet was to close this whole question of accountability. If you take the accountability problem to its utmost, you would want also a health based indicator. Let's set that aside for now, because that's the most difficult. But let's just take it from the context of the exercise of, let's take the PAMS network, before we even get to the PM10 problem. If you take the PAMS network and you ask the question, what is the purpose. Well, one of its major purposes in my opinion, is to demonstrate that effective controls have gone into place, have done what they were supposed to and ultimately have helped us to engage and meet the containment of ozone. The process that you have there in that case, take a small example if you've introduced reformulated gasoline into a non-
attainment area and you have an expectation of getting a certain percentage control of hydrocarbons as a result of introducing that gas into the marketplace, you've taken that as a credit in your SIP process, then I say that you have to be, you have to demonstrate that you've actually observed that change in your network, in terms of a reduction in hydrocarbons, in the ballpark of that exercise. That's the first question that you

would address. The next question goes onto the next step, which is all right you've got this change, did it give you the expected reduction in ozone benefit that you basically claim probably through a model, and if it didn't, the question is why. Is it because the science is bad in the model that you used, or that there was, even though you see through the fingerprint of reduction of reformulated gasoline species, but something else came into place and made up the difference in the VOC and that's why you didn't get a change. All of those things are what is part of this process. In terms of implementing this with PM, the exercise here is that we're about to, we're in the process of imploring this monster network. We're going to spend a lot of money...

MR. FEGLEY: First I want to make sure we're agreed on which monster network we're...

MR. DEMERJIAN: The operational regulatory network. 1500 sites.

MR. FEGLEY: So, that's much broader than what this workshop, I think.

MR. DEMERJIAN: Yes, but the point is that the super sites are an attempt to augment this base level network to show us where its limitations are, potential areas where we feel augmentation, we might want to consider augmenting the current operational network and what the benefits of that would be to the

various communities. From the perspective of the accountability community, is we're saying can the super sites add certain information to the basic network that's going to be deployed, that would allow us to address some of these issues. That's what we're about.

MR. BACHMANN: Now an example is one we've just discussed. It would be nice to see as a result of the diesel controls, that mass went down and that it went down because carbonaceous material that has the characteristics of diesels went down. Then something that none of these networks are talking about, ultra fines didn't go up at the same time.

MR. SCHEFFE: But embedded in that, in the carbonaceous material, I mean right now the routine networks, all you're collecting is a gross number. You're picking up total carbon or total organic carbon. So, what you need to do is then speciate that organic fraction to the indicators that are representative of local sources of various categories, trying to get that signal.

MR. SOMERS: Diesels and particulates have some source signature compounds in them that are present there to a greater extent. Glen Cass has identified some.

MR. DEMERJIAN: I mean to some extent the targets of opportunity, which are occurring under Title V...Title IV and I guess some of the

activities under Title I, those are actually engaging in the most difficult part of the problem, which is the partitioning between nitrate and sulfates and basically do we really understand how that partitioning works or the implications of ammonia, etc, etc. But they're out there and there are, maybe not so easy in urban areas, but when you go out into the boondocks, where everything sort of happens, is in terms of that happened in the sense that everything's aged, and you have a kind of common denominator and you don't have a lot of local influences and a lot of things changing dramatically. You can see the effects of some of these changes already.

Now what we don't have is, unfortunately, we have the PM10 data but we don't really have a lot of PM2.5 data to do that.

MR. CHAPMAN: I'd like to submit that if health is laid aside and then come back to, it will never be meaningfully addressed.

MR. DEMERJIAN: I meant to set it aside, so I could at least present the context.

MR. CHAPMAN: I think it's necessary to consider these things, even though it's a little more painful, more or less simultaneously. The reason why I feel this way is, I think there's an option that may prove most effective for true, you know, deepening understanding of health effects and the

significant. If you were tracking health benefits of regulation, which I think is sorely needed and this unidentified option is not to just lay the super site ultra fancy monitoring capability in some locations over the operational network, but rather in some places at least, to modify the basic level of network to maybe measure a few more pollutants, including gaseous pollutants that we now have perhaps slated to measure and to measure frequently and for a long time. For example, I think that time series studies of daily events or short term events are going to be exceedingly difficult to make headway in, unless they're every day measurements of a limited number of pollutants for a long time and in at least some places. Do you see what I'm saying? I think this intermediate option, from the health point of view, ought to be in the active running right from the start.

MR. DEMERJIAN: What I would ask of you is, can you identify what would be some of the commonly tracking and archived health benefits or health indicators, that we can use as part of this process. There's special studies being done for like asthma admissions, a study that's about to start in New York City where they're going to try to monitor asthma admissions from emergency rooms in two areas in New York City and they're going to be monitoring a whole suite of PM chemical speciation measurements and obviously their hope is they'll be able to correlate some

of this information with these enhanced hospital admissions. Is there a database or a formal record of certain health indicators that we can use to try to tie this system down?

MR. CHAPMAN: The answer is no, because it's never been done.

MR. DEMERJIAN: Is it because it can't be done?

MR. CHAPMAN: I think it can be done, but it takes no less thought and no less advanced preparation and no less work to enter communities and really get a community population based set of samples, than the monitoring. This is what worries me about this entire exercise. The assumption seems to be made, either advertently or inadvertently that all we have to do to improve health effect studies is to get better monitoring. Nothing could be further from the truth. We have to upgrade qualitatively the health data collection capability no less than the monitoring capability and maybe more so. Specifically if we're not careful, we're going to be left with mortality statistics again and one or another kind of context with the medical care system, which is many people have pointed out, including Lester Ray(phonetic) are only indirect measures of community health. We've got to set up access to community based populations, in my opinion, there's no substitute for time and promptness

and synchronization of evidence here. I don't think this will be a massively expensive effort and I don't think it would consume a major proportion at all of the overall budget allocation. To absolutely being given equal respect or else we'll look back in 10 years and say we really lost a lot.

MR. VANDENBERG: But don't you think that to have an indicator, that's effective, it needs to be both sensitive and specific. The problem I have with this whole area is that in terms of ambient monitoring, start from emissions and go to ambient conditions, if you could have a fairly sensitive and selective indicator for that, relevant to the PM issues. When you get to the health issues, I don't think we're anywhere close to that. We don't know.

MR. DEMERJIAN: Where are you going to conform these factors.

MR. VANDENBERG: Absolutely. We've skipped exposure there. I mean you've got three steps laid out, but if exposure is in there, you could have a very sensitive and selective indicator.

MR. CHAPMAN: It has to be there. They have to go hand in hand with the health consideration. Wrestling with the very issues that you're talking about.

MR. VANDENBERG: Well, again I'm trying to understand this group actually. It seems, as

you laid out here, I think you were quite right. As you go down this chain, you move towards verifying indicators of accountability if you will, and that as you get into the health ones, it's much more difficult. In fact, I would say your terminology is not correct here, that you can verify anything in that at this point. You can't verify health benefits at this point, because we don't have a sensitive and selective indicator that's relevant directly to PM. We would like to have one in the future, but I don't think we have it now.

MR. BACHMANN: Blood selenium level turned out to be interesting, obviously blood level has been a wonderful indicator, how lead worked.

MR. VANDENBERG: But that's exposure.

MR. BACHMANN: But it's one step closer. We don't have that hidden PM. Chas, the thing that worries me is that you're thinking in terms of time series, but I don't think time series is going to tell us things about long term health.

MR. CHAPMAN: Oh, I absolutely agree, John.

MR. BACHMANN: And there are so many other overarching trends like diet and health care and everything else, that separating out, even if we believe our studies up until now, we're talking about a three to five percent effect. So, if you could separate

that out on a daily time series, it's damn hard to think about separating it out over the long term.

MR. CHAPMAN: In a way the very recent difficulty, I'd have to say I rest my case. That's exactly why we need to devote more or less equal attention to the health question.

MR. BACHMANN: I like to do things you can get done, that's all.

MR. CHAPMAN: My sense is that it is doable with certain indicators in certain places, in which exposure will substantially change.

MR. DEMERJIAN: Jeff has had his hand up and then we'll go to you, David, and then here, over there. Then I'm going to ask that our friend from Canada, because I know Canada is actually trying to do this, through their health care system, they're actually trying to monitor hospital admissions as a result in air quality. Jeff, do you have a comment?

MR. COOK: I didn't want to throw you off track. I just, I'm sitting here trying to take notes and get an idea of what it is you're doing here. The math says that for every 50 speciation sites you have one super site. One sixth of those per 300. So, if we're looking to actually track things, I'm wondering what the role of super sites will be with respect to the speciation sites. Are we being really realistic about what we can expect out of the super sites? If we set

the goals like the goals that were set for PAMS, we have to do something other than establish a PAMS network. Because the type two sites give you a real nice signature, what's happening with the fuel changes. But they won't tell you what's happening with power plants and those kinds of things. So, if we're looking at the first item, to track emission controls, I think we have to be realistic about what we can expect out of this and then the 300 sites and 50 don't make it, then maybe the super site needs to be redefined, with something that will even give you the answer. Your portrayal this morning of the S02 worked, because there are a lot of S02 monitors there are standard methods and there are siting criteria. So, I think the time to talk about accountability, we need to address some fairly basic spatial kinds of considerations. We've talked about motor vehicle control, fuel controls, you can list the compounds that you need to measure for those VOCs, NOX, and I think we can get beyond that. Are you using a barometer when you want a thermometer, are we using the right measure? How do we build this thing, to round up so it gets in the hands...

MR. HOMOLYA: I'm just wondering, if you're going to get out of the six or ten super sites, I assume you're going to get a lot of information to understand relationships that are more subtle, so you can get more measurements. So, I can see that the

models would benefit from that. I don't see how the monitoring is going to benefit, or the health effects studies, from such a small number at the super sites.

MR. DEMERJIAN: Well, my thought is that, for example, with the chemical speciation that's being proposed at different sites, there's a lot of debate about whether that's going to be the most effective way to get all the information we need or whether those, the way that network is going to be deployed, is going to be sufficient to do everything that needs to be done, in terms of cross science, source attribution, etc. Some of those issues, like source attribution, have some implications in terms of some of these emissions and accountability issues. So, if a super site were installed at a place that had, one of these chemical speciation sites running a standard FRM mass measurement, my expectation is that at least some of these sites are going to be set up that way, then what you learn from the much more detailed types of aerosol chemistry that's probably going to be performed through these super sites, should have some influence on whether, how good the chemical speciation network is, that's being deployed routinely as part of the day program, where it could be augmented to benefit, to solve a variety of public problems, which go beyond maybe the scope of what was originally envisioned in terms of the network, and this would all be very useful

in terms of how to, not so much redesign, but to help change the course of the operational network, such that it becomes much more responsive to the various quote unquote, needs of the user community. So, that's what I see happening and I guess other than the issue which I think is real, the question of spatial homogeny and how well can you capture that kind of homogeny by one single measurement, that definitely is an outstanding issue. But I kind of agree with John, one of the ways that you would restart thinking about how to deploy these sites, in terms of supporting this exercise, is that the emissions mix, that typically occurs across the country, I think could be characterized by maybe five or six different types of composition of emissions patents, whether it's areas that have refineries and urban and a certain set of industrial sites versus the typical source distribution that you find in the northeast versus the issues that are going on in the south because of the way things have developed there and then the west coast. I think it's possible, it might not get 100 percent of the typical mix of emission sources, but I think you can capture a fairly good percentage of the emission source mix, by characteristically selecting some sites with some thought. That could then be useful in terms of again trying to do this demonstration.

MR. HOMOLYA: I see that, but it's the design issue, which of course, one normally does

that first to inform the, to suggest the design and then you have the larger number, but once we've got the larger number we're invested.

MR. SCHEFFE: It's an interesting approach here. I mean you have a network that's out there and the relationship that Ken's described with these super sites, is that in order to, on a much more efficient time basis, inject modern methods, better advanced procedures, that's how these super sites would interact with that routine method, that routine network. So, it's not just an augmentation in terms of getting sexier measurements, more highly resolved measurements, it's an augmentation in terms of a constant feedback, between the various systems that are out there and that's an important point. That's part of the whole accountability of it that Ken's getting at.

MR. DEMERJIAN: Jim?

MR. HOMOLYA: I think what I'm hearing, we're having a problem in talking about, we're trying to show the association relationship of these measurements to one another. I think in the process of our doing that, we're essentially talking about networks in the context that they're replicating, I mean they're responding to the same objectives. I think that's dangerous. So, in trying to associate a super site network with tracking effectiveness of emissions controls, I think is, it kind of goes back to the point, I

think that stretches the reality, the practicality. We would never design a six site or seven site network to address that first objective. So, I think it's useful to show the association. I think it's dangerous to say that they all are going to accomplish the same objective in the same way. It challenges to break that apart.

MR. DEMERJIAN: But as a result of let's say a super site design that might get you a much more detailed information on the organic composition of particulate, to me that would provide insight in terms of how useful that kind of information might be in doing source attribution and potentially looking at the implications of a, some type of control on organic particulates.

MR. HOMOLYA: Its methodology, development of refinement of that platform and it's implemented for a practical emissions control effectiveness, monitoring determination in an associated network, not...

MR. DEMERJIAN: I guess what I don't want to leave you with is the idea that I'm claiming this super sites network is the network that's going to be used for accountability. It absolutely is not. It has to be the operational network. It's just the question of whether the operational network is capable for addressing these issues. The hope is that the super site might provide some insight, in terms of how one

might augment its capabilities, that's what we're talking about.

MR. SCHEFFE: Just maybe for a general point, what you might get in a routine network right now the way it's scoped out to be, you might be able to pick up a signal that tells you things aren't working like you thought they should be, they should be predicted from a model. But you probably won't have the kinds of measurements in that network to tell you the why, why things aren't working, the diagnostic kinds of things, that you might have available in an augmented site, from a super site. You can then go into and actually find out why from a process viewpoint are things not working the way we thought they should be working. That's again how they'd be augmented. There are those kinds of interactions that I think are pretty critical. So, I think a lot of this is communications and sort of an understanding of the connections between the networks and the definition of objectives. They can have the same objectives, but they meet those objectives in a complimentary fashion. It's something we have to acknowledge.

MR. PIETARINEN: Looking at it from maybe a one sided point of view, but I also think that part of what I would be hoping to get out of the super site program is a long term network, in that as you look at what the super site network tells you, you can get a

better handle on what we should be focusing on, and hopefully develop more cost effective methods for obtaining those measurements. Then that makes the long term program more viable. I've heard people mention a couple of times about the cost of this, talk about daily speciation sampling in the state agencies, that's a necessary thing to do. That's really a source of, I think somebody said it's the same as doing three months, every three days. It's not. It's much more expensive for us to do that daily sample, than it is to do an... So, I hope that some of what we get out of this would be these longer term networks, more sustainable, because the cost can be an issue for us in the long term. The question though about the accountability part of this, I think that you're basic premise here is great. I think that this type of exercise in the PAMS program, which you used as an example, can be very helpful in making that work. What about super sites themselves? How do we ensure accountability within that program? To make sure that it's doing what it's supposed to do.

MR. DURRENBERGER: There's a set of objectives for the super sites and the accountability should be somehow related to those and the accountability is to Congress and to the public. EPA's accountability to Congress. But it should be measured, I would almost start with how you're going to report it

and work backwards and try to figure out what engineering or whatever you're going to use on them and then work backwards how it lines up with the objectives.

MR. CHAPMAN: What are the objectives?

MR. DEMERJIAN: For the super sites?

MR. CHAPMAN: Yeah.

MR. DEMERJIAN: They're in your package, I guess. Rich, is that right?

MR. SCHEFFE: Yeah, they're in your package. They're in this blue document.

MR. DEMERJIAN: I mean right now, I would say those are a very broad set of objectives. I wouldn't want to be the one that's held accountable for demonstrating meeting all of them. But it's a valid point. You can ask that same point for every special study that's ever been launched. Has it ever closed on the fact that it said that it was going to go out to do something, did it ever close the problem saying yes, we accomplished this, it's all the things we said, all our objectives of what we said we're going to do, the program is over, we've analyzed the data, here's all the results and here's how we met those objectives. I think if you go and look you'll find that a lot of times programs fall short of meeting their objectives, for a

variety of reasons. But there's nothing wrong with going through that process and at least identifying what you think are the highest priorities of the things you want to accomplish and then showing the substantial progress in accomplishing these things.

MR. SOMERS: An issue you were mentioning before, looking at regulations and seeing through your monitoring data if you're getting the benefits of your timing. I remember that we tried that several years ago, looking at C0 monitoring data, to see the benefit of the oxygenated fuel program in reducing winter time C0. It was a relatively complicated project, also data the Research Council did a study on excess and I believe the White House Council, too. In the end we were able to show a benefit from the winter oxygenated fuel program for CO but a lot of factors had to be considered. Vehicle turnover, meteorology differences and things like that. My point is that it can be done. We're talking about the winter oxy program for about 10 percent, so it's not like it's a huge number, but it's a benefit.

MR. DEMERJIAN: Ken?

MR. SCHERE: Yeah, I was going to, I'd just ask the question, Rich must have known I was going to ask it because he just left the room.

MR. DEMERJIAN: If you want we can wait until he comes back. He's probably gone out to the

mens room and will be back in a minute.

MR. SCHERE: Well, let me just raise the issue and then if other people have some ideas. One of the purposes of the super sites would be that they're test beds for new experimental methods and to get measurements that might be more appropriate for things like accountability. It's not an operational network in the sense of for additional networks that are established. But one of the things that I observed, the traditional monitoring networks is that once a methodology is in place, there's a tremendous amount of inertia that gets established, even to make small changes in that methodology can take a tremendously long time. Rich made the comment that it could be iterative, but he didn't indicate the time scale of that iteration.

MR. DEMERJIAN: When you say he was saying iterative he was talking really about the regulatory network.

MR. SCHERE: Well, iterative, I took it to mean between the effect, between what happens at the super site and for instance the speciation network. Given how long the arguments on the NOX versus NOY monitoring and the PAMS, for instance, which is basically simply moving your converter, there's still a lot of gnashing of teeth about something relatively simple. I'm wondering whether this concept of

iteration, on really different techniques, is actually going to happen.

MR. DEMERJIAN: Rich, this question is actually for you, but let me see if I can summarize. You said that there'd be this iterative process between the PM, I'm sorry, the super sites and the base level network. That is that as we learn information it would feed back into potential changes and practices. The question that's been raised, what's the realistic time frame for that? We've had examples like in PAMS where we had the NOY issue and it still isn't implemented or even the...

MR. SCHEFFE: Sure, sure. I mean, look you can't predict the future of any of these things. I think that's pretty clear. But let's use PAMS as an analogy. There was never a vehicle in PAMS to implement that transitioning in a logistic, in any kind of a logistic manner. I think we can look at super sites and say hey, the public, the government or whatever has gone off and made a conscious effort to put aside serious resources for that kind of transitioning over time and that's one of the ways to view these super sites. That that is a formal mechanism for doing that. So, that's my basic response to that kind of question, we didn't have that before.

MR. SCHERE: Well, Rich, I don't quite agree with that in the sense that there's been a

lot of very relevant fuel programs in which the government has contributed and participated. For instance the Southern Oxidant Study and NOY issues, that you could certainly say the information is out there, it's in the peer reviewed literature, but yet it's taken so long to make a dent in the operation.

MR. SCHEFFE: I agree with all of that. I agree and it's been extremely frustrating to see the slow embracing of some of the techniques that are out there, that are very close to being routinely implemented. I agree completely with that and it's extremely frustrating. I can say that the one difference here and this is, there's something much bigger in this program, than just measurements and it's bringing together the research community with the regulatory and state and local communities. In the past, by and large, a lot of those programs, rightly or wrongly, were viewed as research programs, special field efforts and so forth. The differences with the super sites program, is we're consciously calling this part of the regulatory program and we're calling it research at the same time. Hopefully that kind of fostered partnerships will go somewhere. Again, in this whole accountability process, I mean one of the things that has to happen, this community has to make, the managers of this program accountable for seeing that that kind of transitioning happens.

Another difference here is that PM is so problematic, it's not measuring a gas, that sometimes the problems are so complex and so difficult in particle measurements, that we admit up front that we don't know really what the heck we're measuring in a lot of cases. So, we better have a process built in place, so that we can continually update and improve the measurement systems that we have. I don't have any answers, in terms of how you force that kind of fast embracement of new techniques, other than this is a step in the right direction. We need to be held accountable to see that it happens.

MR. COX: In terms of status and trends, we can do that now with the current methods, for ozone and S02, and I would imagine with PM. In fact when you're trying to do those kinds of analyses, you really want a, you really want more sites to do the analysis, that's one of the critical factors. So, I don't see the super sites being useful in the status of trends, except perhaps in terms of understanding the process of how some of the pollutants interact.

MR. DEMERJIAN: I think the one problem, you can do some trend data with PM10, but with the change in that trend, it's very difficult to identify why it's changed, what component changed and what were the sources attributed to that change. Ultimately PM2.5 poses an issue that has to be

regulated, in terms of all programs, we're going to have to identify what sources we're going to go after and we should be in a position to demonstrate when we go after them, we see the expected benefits for those.

MR. COX: What I'm saying, when you get to the point of reporting those, you're going to have to report on the basis of...

MR. DEMERJIAN: Yes?

MR. MEYER: I think one of the other announced purposes of the super site network was to do a side by side comparison, the more conventional techniques that are going to be deployed. To me I think that's one of the most important purposes of the network used to do this accountability issue. Because those of us who are in the regulatory game, the objective of that is to compare whether or not using the measurements, whether or not you're going to meet the standard. So, what you want to be able to do, is to wait. The procedure that you use to determine that, to what's really out there. So, in other words, if the federal reference method responds a certain way, how do the rest of these indicators respond. That seems to me to be a crucial objective, accountability for this network. One thing I noticed in reading some of the material for this, was that apparently we're not planning to do any kind of an attempt, any kind of a speciated sort of analysis, samples that we've collected using

records at the super sites, rather they're going to be evaluating, I think three techniques, being proposed to states as opportunities to do the speciation. But it seems to me that we might be missing an event, if we didn't augment those efforts somewhat at least, to look at the speciated information that one gets using the method, that's actually going to be used as the basis.

MR. DEMERJIAN: I agree with you totally. I guess it's my understanding that probably wherever these super sites get implemented, the hope would be there would be an operational site, either there or very close by.

MR. MEYER: Well, I think they are planning that.

MR. SCHEFFE: No, Ned...here, there's a balance there, because we have to get input from the community in designing a program. We can't be putting in too much about what explicit things we want to see happen. I think it's pretty much a given, that he community at large wants to understand the differences between the federal reference techniques, not just in mass, but in terms of components and the other speciation techniques that are out there, that will more fully capture an aerosol. So, I suspect that will happen. I think we will encourage that very strongly and I think that that's definitely going to be a part of the program. I think it's probably even going to be

part, there's even other studies that are doing that. Jim Homolya, for instance, says that speciation is a comparison study, in which those same kinds of questions, in terms of what's picked up on just a Teflon filter for the mass sampler versus what's picked up on all the filter speciation sampler, that will be addressed in probably oh, an array of different studies. So, I think that's, people are real curious about that.

MR. DEMERJIAN: A question in the back.

MS. GUNDEL: I have a question and a suggestion. The question is: if the rates build in milestones for accountability into a program, so that in a timely way, accountability could be measured in a way, I would imagine the first issue you would pursue is to put into the process a schedule of time lining for these accountability checks, to be followed by updates to the measurement monitoring protocol. You couldn't really do this in a super site which is more research oriented. But the other parts, we have some accountability milestones and funding etc, in the planning stage, to ensure that this can happen. My suggestion is, to create some vehicle to present new results, and a workshop that would allow the EPA to visit this issue on a yearly basis or at some appropriate schedule. I offer that as an idea, to try to make it more real to the community at large and to monitoring

stations, etc. Perhaps if we could, my second suggestion is if we could have an expression of measureables. For example, when Petros this morning showed we liked the federal reference method and the speciation sample, this is something that everybody can then use as a standard, is there a way to make accountability standards, without killing our anticipated flexibility. Those are two suggestions, I want also, to express our requirements for accountability in some way that's ....

MR. DEMERJIAN: Some people may argue that the SIP process is one of the mechanisms where milestones are set. I would claim that's great, but then let's make the SIP process accountable and let's have the exact points that you're making, that in certain periods of time you go back and you actually look and see if you've accomplished what was identified as the program.

MS. GUNDEL: And then you make an adjustment.

MR. DEMERJIAN: Yes, that's correct. That's kind of the process.

MR. MEYER: Can I make a point about the SIP process, because you made some statements this morning and I think your thinking is influenced quite heavily by the experience with ozone, where there's this very special time frame which has

been built into Title II of the Clean Air Act, which is quite a bit more extended, than exists for any of these other pollutants under Title I. At least the way the law is written, when SIP is submitted for PM2.5, basically they have, I think it's something like three to five years where they have to retain. And if they don't, then consequences flow from that from the Act. So, you know, it's not like you come up with a plan and don't do anything to check it out for 10 years and then you discover you're not making it. For most pollutants, it's quite a bit different than it is for the ozone and there's not a great deal of time between when you actually begin implementing these programs and when the law says that the standard has to be met, for you to be doing all this accountability, intermediate checks. The law itself I think has a mechanism for accountability, it's called a SIP revision. If you don't, you know, the way the Act is written, although we've never had the guts to do it, there are consequences if you don't meet the requirements within the time frame.

MR. DEMERJIAN: We know that fines get extended and extended and extended, if ozone is a reasonable example of what can happen. I guess what I'm saying is that I realize that we're in a bit of a straightjacket, in terms of the way the law is currently set up . But in reality, there are certainly many examples where SIPs have been written, standards

haven't been met and then they've been revised and they've been extended time frames. I don't think there's any reason to believe that that might not happen here as well, unless this standard isn't as stringent as I think it is. It's very possible that once Title IV all gets done, we're going to find out that we're in great shape with PM2.5. I don't think that's going to be the case, but it's possible in some areas.

MR. HOMOLYA: I think all those investments is a great example. You look at the SIP process, there are SIP programs I don't know for how many years. You were supposed to take samples, and you were supposed to submit a report and showing the reason for the problems. We did all those things in New Jersey. We didn't come close to setting the standard. That says something about the way in which we were tracking ourselves or holding ourselves accountable. If we did this exercise, in meeting our goals, we never got to where we were supposed to be.

MR. DURRENBERGER: The way I'd like to improve that process, is that the first time that you didn't meet your goal, the first SIP that you did, and you got there and you didn't make it, it would've been nice for you to have been able to go back to that SIP, look at where you said you did control and show that you either accomplished it or didn't, and if you didn't, explain why. It might not have been your fault at

all, might have been that you should've gotten the control, except you're BMT doubled over that period.

MR. HOMOLYA: I think that's one of the big criticisms with the program.

MR. DURRENBERGER: I'd like to say something about the SIP process, because we too have done the same sort of thing. The way that I was tried with the emissions inventory estimates, which is a very, very soft way to do that, what should happen in the SIP, is you define how you're going to track, how you obtain, the reductions you claim you're going to get. That should be defined in the SIP and then these metrics that you use, it should be part of the SIP process. It should not be an emissions inventory type thing. There was supposed to have been a tracking mechanism set in place for the 15 percent reductions and nobody ever can figure out how to do that. That was due in February of '97 and nobody could understand or define clearly how to do that, to show that you either made it or didn't make it.

MR. DEMERJIAN: For VOC.

MR. DURRENBERGER: For VOC. There were many things wrong with that concept, but it was not defined on the front end. So, that should be part of the SIP process, define the metrics, you should only use to show that and then explain why you need to track it and see whether you made or didn't make it.

There are many reasons why I think we didn't make it. Population growth, BMT growth, a number of things in the early SIPs. Yes, we have done I don't know how many SIPs in Houston and failed to make the standard each time and I think a standard is unattainable in that area, to be frank with you. At least you can make progress. That's another thing, just looking at the maximum concentration is not enough of a metric to look at. There's other things that need to be looked at. If you want to try, let's define the metrics you're going to use and define that on the front end of things, so that those things can be collected, along the path and then as defined, establish whether we made those things or not.

Now back to the monitoring network we're talking about. We see changes in the standard regulatory network, then these five or six super modeling sites, can give some insight as to why those changes have been made. What has changed? It may not be the total picture, but at least it can give some insight into the specifics of why we are seeing that change. Again, defining the metrics used to track things, is going to be very important.

MR. DEMERJIAN: Jim?

MR. HOLOYA: I'd like to, I think Cyril made a decent suggestion regarding time lines and accountability. I'd like to bring that into the super

sites network. I wouldn't even call it a network, super sites. This morning we heard, half the discussion focused on organic speciation and the importance of it. I thought I heard the importance of it, I also heard the lack of ability for information to provide that. Certainly when we began to look at development of this 50 site trend speciation network, which we had a pretty simple objective, which was to be able to track national trends in mass and chemical composition, PM2.5, and measure metropolitan areas across the country, sounds pretty straightforward. We came out of the block immediately asking if samplers had the capability for collecting samples for organic aerosol characterization. When we presented that to the research community, the community dug in their heels and said this is a need that's come before its time, providing the capability to do this. It suggested that, and I think it's embodied in Petros' summary, was that we maintain the capability to provide that support, but we wait until the research community has agreed to a method which is going to reduce the practice which you can implement in that network. Taking this to the super sites, I would think that it might be reasonable, in terms of accountability and time line, we're rolling out a schedule for implementing these 50 trend sites. Why couldn't one of the accountability, points of accountability in these super sites be for the research community, which this is

going to be the primary research platform, provide the trends network for the capability to implement that measurement. That's not all of it. I mean that's, that I see as an association.

MR. DEMERJIAN: The argument I guess would probably be that that's a research instrumentation in progress. You're asking us...

MR. HOMOLYA: That's a do loop that can go on now...

MR. DEMERJIAN: You're trying to get in through the back door is what you're trying to do, I think by your proposal.

MR. HOMOLYA: No, I just want something to fall out at the end of the pipe.

MR. DEMERJIAN: Well, I'm sure that it would have to be on their priority of things to be considered. It would be nonsense not to. Whether they take it to the point that it becomes an operational routine measurement that you're going to embrace after this is over, is an issue, I think it's one that's certainly reasonable for them to ask. That they set their sights to that probability.

MR. HOMOLYA: Rather than surmise or suppose it, in terms of your accountability concept, if we feel that that is a needed outcome, then my suggestion is, put it on there.

MR. DEMERJIAN: You're saying in

terms of tracking something like the diesel situation or something like that. You're saying it's one of the measures you'd like to see brought into the category here.

MR. HOMOLYA: I'm just suggesting, if this holds water, I mean the need for organic speciation, the lack of available methodology and the routine network, the trends network, why couldn't the accountability point with the super sites program be an outcome to be able to provide that methodology to the super sites program to the trends network. If some reasonable...

MR. SCHEFFE: Just to try to avoid a little bit of confusion, and Ken if I'm all wet on this, let me know. But I think accountability is one of those words that means a bunch of different things, all right. Look, there needs to be a process in place where this program, where in this ungodly amount, whatever the resources are, are managed appropriately and we get outputs from the program, you have to do that for everything. If you're building a car you have to have accountability measures in place. I think what we're talking about is a separated, we're talking about accountability in the air program management paradigm, and that's the accountability that Ken is trying to talk about here. There is also a need for accountability for this program. That's another issue. I'm not sure Ken

whether you meant to talk about that accountability within this discussion group.

MR. DEMERJIAN: Actually, I did not. That was not part of what I was intending to do. I was thinking in terms of the broader scope of regulation and regulation being responsive to public good and all that good stuff. But let me just take Jim's comment and if Jim is suggesting that the measurement of organics and semi volatile organic particulate matter would be a very important part of our ability to assess the impact of, let's say, the switch in diesel and it's not on the current list, because I have down here, I said, what measurements should be added to the network, to track accountability, if he's suggesting that it needs to be put, that's one of our responses, that these organics are important, and that somehow they've got to be built into the measurement program, I have no problem with that. The only question I would raise is that the only way to get at it. What if I, for example, what if we suggested that maybe using a continuous carbon POM device might be a quick way of getting a handle on the switches in diesel. Is that feasible as well? Then that would be something you'd want to consider. I don't know, I'm throwing it out. I'm just saying that there might be a bunch of things that we might suggest that we think would be very useful types of measurements that could give us a handle on this problem. I haven't

really thought through a lot of the issues, with regard to the diesel exhaust accreditation, but there's a couple things out there that probably could be done to get it, that don't necessarily have to get into, you know, doing total species with GC verification of semi volatiles, but we still give you a pretty good handle on whether the major component of diesel exhaust has changed.

MR. SOMERS: Yeah, there are several compounds very specific to diesel exhaust, and three or four of them, and those could be measured.

MR. DEMERJIAN: And of course the issue of whether we need to really know what part of it is carbon soot and what part is semi volatile is obviously an issue. Because I think that the carbon soot is covered, right, reasonably well?

MR. SCHEFFE: Reasonably well, that's covered, just as carbon soot. But do the note takers already have these important points that we need specific organic compounds that trace back to important source categories, that are likely to control the next several years. So, that will be it.

MR. DEMERJIAN: Back there.

MS. GUNDEL: I'd like to translate Jim's suggestion relative to the milestone. Pro-active accountability, the kind of issue that he raised, which says that within a year, this is my translation, within a year we'd like to have the ability to be accountable for

semi volatile organics. That's a need that's been identified by the speciation network and it's a little bit too advanced right now for the speciation network to carry out. Perhaps the suggestions that have been made and have been put in draft plans for instruments could be incorporated as a component we can put at the super sites, as one way to try and advance to that accountability. I think the accountability that you're talking about is sort of service accountability, which is not necessarily pro active, but to make sure that we can accomplish the goals that we've set up, being all of the documentation that has been prepared. What Jim's talking about is kind of a pro active, creative milestone which I think would be a good idea to affect the program, along with the kind of other things that you just mentioned. Perhaps this kind of goal could be met by listing other kinds of technical solutions or monitoring solutions that need to be added to the program, or will be accountable on the issue of semi volatile organics, if we can reach this milestone by a certain time.

MR. FEGLEY: Ken, relative to nitrates, particularly in the east since they are a small fraction, compared to say sulfates, PM2.5, at least that's what we think, at this point in time. How are you going to be able to determine whether or not say the NOX reduction under Title IV or under Title I or OTAG

in 22 states will have much of an impact on PM2.5?

MR. DEMERJIAN: As far as the nitrate fraction?

MR. FEGLEY: As far as the nitrate.

MR. DEMERJIAN: It's a big problem. That's what I've said is one of the big issues. I think the sulfur is straightforward, but the nitrate changes. The only thing that I think we might have going on the nitrates, is that if we look at depositional patents, we'd at least be able to track the impact of the changes in nitrate, I'm sorry, changes in NOX emissions as a function of changes in deposited nitrate. But I'm not sure if by measuring the nitrate portion, I mean, I actually had a graphic of the nitrate reductions at White Face Mountain from this PM10 network, and also comparing it with the emission change. I hate to even put it up, because I think the data is very suspect. But these are the PM nitrates which my thought is, knowing how that measurement is made there, that there's probably a lot of it being lost. I think it's lost most in the summertime and probably some of the winter data is okay. But this is showing, again this is part of the Title II effort that's, Title IV effort that's going into place and there is, this is looking at the nitrate PM10 fraction, looking at its decline. Of course something dramatic has happened. There's been no change in the NOX emissions, as far as this region is concerned.

Then starting around '94, some of the Title IV activity went in place. So, you know, it's, I don't believe...

MR. SCHEFFE: Let me answer it another way. Part of the idea of the super sites, in routine programs we don't have the capability or the resources to measure all the nitrogen compounds, in the super sites program we expect we will. We expect we'll be able to take ammonia measurements. We expect we'll be able to take nitrate acid measurements, pan measurements, the complete suite of NOY measurements. We also expect to take measurements of peroxides and things like that, which have coupled effects with the nitrogen balance in the atmosphere, to give us better insight into those types of things.

MR. FEGLEY: You need to do the gaseous, the precursors while you're...

MR. SCHEFFE: Exactly.

MR. DEMERJIAN: Actually something that I haven't done, I'm in the process of doing, is I do have all the gaseous precursors for at least most of these years, for NOY at this site. That's one of the things, I want to see how that tracks there. But let me just show you, again this is total speculation, but it's interesting to see that as this has gone through this change and the sulfur has continued to go down, kind of get the impression that we hit a threshold and all of a sudden we've driven from a sulfate environment, we've

now driven up to nitrate environment. I don't know if that's true, it certainly, from a theoretical point of view, it's one of the things that could happen. So, as you diminish sulfur at some point nitrates become a more dominant fraction of the total pie. So, that just needs to be looked at in more detail. This would be much better if this was PM2.5 data, because there's actually, at least from the data that I've seen in our area, the larger fraction of sulfates.

MR. FEELEY: It's still going to be difficult to discern a change in PM2.5 nitrate in the east, as a result of NOX reductions. Which they're in place to deal more with under Title IV acid rain or ozone, than they are with PM2.5 specifically. But the point is to argue that the NOX reduction would also give you some PM2.5 benefit. It may be difficult to follow whether or not that's actually occurring, particularly in the east where nitrate is a smaller fraction of the total. It's going to be a tough task to trend I think, NOX reductions and PM2.5 in the east.

MR. SCHEFFE: You have a complimentary use of the air quality models. The idea too is that if you have enough measurements to test these models, that they're actually working correctly, and then if you reach that point, then you can play around with those models and look at those emission change scenarios and determine, are things working the

way we think they are.

MR. FEELEY: It doesn't have to be a criticism.

MR. DEMERJIAN: The thing you need to realize, and you obviously know this, is that NOX is coming from two major sources, stationary and transportation and they're both going to be getting tweaked during this time. The fact is that when I show that, in my opinion that what's influencing most of that nitrate data in the stationary sources, not mobile sources, just because of where it is and where it sits, is the fact that nitrogen in general doesn't have a long transport time. So, the only nitrogen part that has a chance to make it to that facility, is from elevated sources. But like I said, I don't trust the measurement, the actual chemical measurement of the nitrate. I think it's probably, if I had to guess, it's probably higher than what I've shown you and it's because of the volatilization issues and the way the samplers operate, the samples taken and the direct down...

SPEAKER: But do you trust them?

MR. DEMERJIAN: Well, I guess I do trust the trend. I do trust the trend, I just think there, it has a systematic bias in the actual magnitude. Actually the sulfate data looks very comparable. We have several places we can check it against. The sulfate data looks very good. We also have a high....

we operate at the summit, so we can compare it. Of course as you get higher in the atmosphere, the normal decline, but the numbers make sense. The whole story comes together. But like I said, there's a couple of issues, what happened in '97, the emissions when you get operating you get those numbers from the people that do this tracking.

MR. SCHEFFE: Do you have hydrocarbon data along with that, trends of hydrocarbon data?

MR. DEMERJIAN: Yeah.

MR. SCHEFFE: Any peroxide data?

MR. DEMERJIAN: We have a little bit of peroxide. Peroxide is really tough to make long term measurements.

MR. COOK: A question about what we're planning to deliver in this exercise. Are we trying to answer some of these questions with some concrete suggestions, that EPA please take these things into account or will you go ahead and fund, script out the super sites? If that's the case I kind of like the fact that Jim is taking, where we get down to things like milestones and specific things. I think back on looking at trends, every time somebody puts out a trend, six people come with questions about our trend. So we kind of put ourselves in that endpoint position and say all right, what would we have done differently on the

measurement side to answer those questions so we don't have six people asking questions about spatial representation, adequate number of sites, ... meteorology, methods and compatibility and so forth. These are, you could almost put these in quality control, as opposed to quality assessment. We ought to build in some of these things so that you don't have to have those, you don't have those uncertainties. That variability essentially is lessened. Is that where we're headed with this?

MR. DEMERJIAN: Well, I think the first thing is whether we agree that this is a, is something that needs to be considered in terms of long term use data. One of its obligations is to provide accountability in the management system. If there's a consensus that that's a reasonable approach, then the question is what do we need to make that happen. What is the toolboxes or toolbox that we have to make that happen? You sort of touched upon one of the issues of, do we have in place the right types of analyses to quickly demonstrate things from data that is already compiled and exists. So, for example EPA puts out a trends report, has anyone sat down and looked at the emission trends and the comparability to the trend in air quality and show that there is at least the kind of correspondence you would expect, you expect. I actually did something for another meeting, I didn't

bring the slides with me, but one of the things I did is I tracked the projected, actually not the projected, the estimated C0 emissions, annual emissions for the past 20 years I guess, 15 years, I can't remember, of C0 and then took EPA's trends analysis of the ambient air quality, whatever it is the eight hour max, second max or whatever and overlay that on the emissions trends. One of the interesting things you see is that the trend is there, but what you don't see, which I think is explainable, is you don't see a one to one linear correlation between the reduction in C0 and the reduction in the eight hour ozone, the C0 number. The question is, why is that. I mean there should be an explanation for that. Part of it has to do with the fact that where these sites are and where the actual reductions occur, those sites are saturated pretty much. So, they're not going to see the same, the incremental benefit, because most of the BMT is away from that area. So, that's part of the explanation and why it's not totally one to one correspondence, or at least I think it is.

MR. COOK: But is that the kind of thing, I mean that's an excellent example. Is that the kind of information that we want in this document to go forward to EPA?

MR. DEMERJIAN: What we want to do is identify some set of metrics that we think you can

perform by using this measurement platform, this operational measurement network, and I think what we want to do is draw upon all of these incremental changes that have been, that are in place or targets of opportunity, as a result of current things under the 1990 Act and ask, can we see any of those or will we be able to see any of those? Some of them unfortunately are already taking place and we've missed our opportunity. But Phase II of Title IV will have another huge incremental change in sulfates, I'm sorry, in S02 emissions and some change in NOX. The question is, what would we look for and what kinds of analyses would we do, given the data sets that are currently envisioned for this program and how can they be used to close this problem. That's certainly one of the things that I think we'd like to do. Then I was raising, are there measurements that we would like to see happen, which allow us to do a better job in maybe addressing the effects of the diesel exhaust type of thing. Those are the kinds of things that I thought, and then on the next slide, which I haven't gotten to, but it really gets down to the process, do we see, what's the role of models in all of this. Do we see models playing a role, as providing guidance and then a set of diagnostic tools, that we then use to incorporate in conjunction with observational data, to start to also provide insight into this process, this accountability

process? It's not clear to me that, certainly with Title IV you have, you actually have the continuous emissions measurement data to track the emissions, but pretty much every other component we're talking about isn't tracked that way and certainly on a national level it's not tracked that way. So, we're going to have to have some means in which we're going to have estimated emissions and we're going to want to corroborate the trend in those estimated emissions and what we're seeing in the network. We'll have to worry about all these issues, about growth, about peak growth, population growth, expansion and all that and how it influences these sites. Those will all have to be factored in.

MR. MEYER: But there is no objective here to try to figure out what features there should be in the super site network that would perhaps promote...

MR. DEMERJIAN: Yes.

MR. MEYER: ...the broader goals in that?

MR. DEMERJIAN: Yes, that's, the bottom line is that's what we're about here. But I need to be sure that everyone agrees that this a reasonable process, because if the feeling was that this was not something reasonable, then we wouldn't have to go to this next step. But I'm getting the feeling that people

have bought into the fact that, I mean it's something you would have expected to have been in place since day one, but it's not so easy to do.

MR. HOMOLYA: I think what you're talking about is a little... Some of the things we're trying to do in this trends network, is to try to build up data quality objectives from ground zero, to identify what, how much of a trend are we interested in seeing, what would we consider a significant difference and then building up sampling frequency, site location, considering the precision of the methods, measurement methods, so that the end game is more perspective planning, to be able to evaluate trends that sort of retrospective analysis, now we have data we've seen new changes. That's a little bit about what you're talking about here.

MR. DEMERJIAN: The idea is that if we embrace this concept, then what do we need to set in motion, in terms of getting the tools in place to do this tracking as we, as we decide to collect this data. In some instances the reason its interesting to see retrospectively if there's been any major incremental changes, is actually some data in place will check out some of these things even now. We could demonstrate what the given, with the current data set, it's all the more reason to be confident that we can do other things with the newer data set.

MR. VANDENBERG: One of the things that, moving to the super sites specifically, that is attractive about it is, is the collection of many more types of chemical and physical characteristics of the air than you would have with the speciation sites with a routine network. Trying to, back to what Chas was saying, it's hard to do the health study and bring that in a little bit. We have list and the report here of the 10 sort of things that the health scientists would like to see measured in the air, because those things may be related to the actual characteristics or constituents that are causing the effects that we're concerned about. If you take one example of those, which is transition metals, use that as an example, it seems potentially valuable to have measurements of trends of transition metals in different size fractions over time, as being very important. In the long run, when we look retrospectively back and support some of the health studies that in fact need to occur in a sort of retrospective fashion. So, if you go beyond that and you look at some of the other types of things, we'd focused the discussion earlier on diesel emissions and organics, those are actually somewhat lower on the list, in terms of the relative level of concern for some of the health endpoints, which was the more acute responses, which tend to be more related to things like the transition metals and perhaps the ultra fines, the

surface area concerns, where we don't know if that that's a problem, but it could well be.

This particular potential network, I'm going to call it a network even though it's only maybe five or 10 sites, has the potential to add something very substantial, above and beyond what I see happening with the rest of the 1500 sites, and those sort of things might be in fact of great value. What I'm struggling with is to figure out how we bridge this into an accountability measure. That's where I kind of start to go well, how does this work? How do we phrase something in an accountability fashion?

MR. DEMERJIAN: One of the things that I had on here, which is what are the likely, what are the most likely health indicator measurements you track to measure responses to changes in the PM2.5 air quality? As far as I know there's at least two studies that are ongoing, that are attempting to track hospital admissions for asthma and correlate that with PM2.5. The question I have is, how many more of these studies are out there going on and can this data be brought into the database, and actually factored, and just like we're trying to do a correlation with emissions and change in air quality, can we then do a... of change in the equality of change in hospital admissions. I don't know, but I mean but that's the kind of step that one would like to be able to take, but obviously since we

don't, historically we have and this community hasn't had control over with what goes on with those kinds of databases, I have no idea whether that's going to be realistic or not, during the tenure of this super sites program.

MR. SCHEFFE: John's even talking not as much about a health endpoint, as much as an ambient endpoint.

MR. VANDENBERG: I'm talking about an ambient.

MR. SCHEFFE: John, maybe in terms of this accountability model, we assume that transition metals are bad players and we want to embark on the issue of control programs that attack transition metals, and we think there are some categories that lend themselves to petroleum and so, we have said that addresses part of that problem, I don't know how realistic that is. But anyway let's say you have a control program that is harder for transition metals, the accountable part of that on the ambient side then is taking measurements that confirm that the emission control steps you've taken are really, are realized in the ambient air.

MR. VANDENBERG: Would you find that though in the 250 routine chemical speciation sites, or do you need to turn to the super sites to be able to do that? I'm not sure if you would not already

get that.

MR. SCHEFFE: You might get some of that, but I'm not sure either. In terms of some of the, you're talking about the soluble component of the transition metals. I'm not a good enough chemist to really answer that question, as to what you're pulling off.

MR. VANDENBERG: Let's use another example, we'll use ultra fines. Because I don't think...

MR. SCHEFFE: You're not going to get that with ultra fines.

MR. VANDENBERG: So, you know you're not going to have that. Only really the super sites are likely to pick that up.

MR. COX: Whatever you do at super sites, I don't think they're going to tell you, you have to decide whether it's worth doing everywhere. You'll find that you're probably not going to do that. The super sites, because they're so few, can't really tell at how many of the other sites and which ones. That seems to me to be the critical question, technology of the other sites....

MR. VANDENBERG: But I think if you couple that with health studies, it helps you to focus your attention on those things of greatest concern. I don't think in isolation super sites are going

to tell you what the answer...

MR. COX: But once you decide something is important and you can only do it in a certain number of places, the super sites don't tell you where to do that. They don't tell you how many you really need in the sense to get the kind of data that's going to do anything, you know, in terms of modeling is going to be comparable to the health data.

MR. VANDENBERG: Unless there's something in the super sites that's correlated to something in the others, that lets you make some ties that, which I don't know.

MR. DEMERJIAN: One of the concerns that I have with regard to some of these very specific potentially, you know, even the things like certain trace metals that augment, solution phase radical chemistry that grows into... We could sit down here and speculate on thousands of mechanisms and in some sense I'd be really concerned that we're chasing our tails. But the other issue is in some of these very specific types of exotic compounds, is they may be very much related to a very tight grouping of elemental sources and actually only occur in a few specific places and may not be, may be a problem in terms of trying to deal with that in a more ubiquitous network. But the fact is, if that's, if such things come about, then you'll have to deal with them. The other thing that could

happen, along the line if there's technology based emission controls, that just happen to come on line, and they're going to have a perturbation, let's say in a particular heavy metal. I mean one of the things that could potentially change, I guess in the near future is Mercury, as a result of flight emissions. I actually already know where Mercury fits into the whole speciation of PM2.5

MR. SCHEFFE: Most Mercury's in the gas phase, it's not going to be in particles. I mean it is picked up on the XRF...

MR. DEMERJIAN: But it's a small particle. But it's these kinds of targets of opportunity that might come about as some control program is put in place, where you gain a whole bunch of benefit in a place that you didn't expect it. I suspect that the introduction of struggers and SCR must have reduced a lot of the metals emissions. They had to. I mean, they're basically washing everything out. I don't know if anyone has looked at that perturbation.

MR. SCHEFFE: That's, that's, you get a lot more when you have this big control program.

MR. DEMERJIAN: You should be able to see in the data in the northeast. The problem you have is people that collect samples, like the samples, these PM10 samples that I've been showing you, they're actually stored and the potential could be

analyzed for metals. But it's not like someone's going to rush out and do that. It's a lot of money to do that measurement. In the back of your mind will be gee, I wonder if those samples are really going to maintain their integrity. The same thing for the hydrol samples, those are all collected and stored.

MR. WEST: I just wanted to say I'm confused. In discussing accountability, I really think it has to go beyond the six, seven or eight super sites. I mean they're just research sites which are going to enhance the future of the quality of the routine sites. So, the accountability really goes way beyond these six or seven sites.

MR. DEMERJIAN: Again, the accountability is in the context of the control program and the reason there is input and the reason I was asked to pull it into this exercise was looking for something that ties together the common features of these many areas and will be demonstrating their effect. Since the PM, I'm sorry, since the super sites are thought to ultimately result in some augmentation of the network, the desire was that that augmentation should also consider this concept of accountability, in terms of the whole management. When the time comes and you have to manage for PM2.5, the time framing that you would have to have an accountable system and that accountable system actually is, you know, you can

sort of stack up what it would look like, from a heated demonstration. We've given one model of this for ozone, but there's a similar model you could write for PM2.5. But again, we're talking about something that's way far away. I'm saying in the meantime there's lots of things you can be doing to just do the traditional trends tracking type thing and look for perturbations that could be very helpful in terms of retrospective and stuff that's going to occur over the period that this network is going to be employed, that we should be able to see those and we should be able to demonstrate the kind of cause and effect relationship. But going beyond what we're not really getting a handle on is how do you come up with figures for what's supposed to be the bottom line for this in the first place, which is the health implications, the benefits to society, in terms of reduced masses of PM2.5 and do we see benefits to ecosystems. Actually this should be more welfare and one thing that we should mention is, there is a network in place for looking at visibility impairment and that should show some response with regard to these changes. That's something also that is included in this process. So, it's...

MR. WEST: We're just sort of focusing on these seven or eight sites, but this really goes way beyond that.

MR. DEMERJIAN: It does but the

subject of this meeting is how PM sites are going to be, what their role is going to be in the big picture of the PM monitoring program. Ned?

MR. MEYER: It seems like one possible program objective would be try to identify surrogates that have some more complex kinds of things that are going to be more difficult to measure and so forth, and more expensive to measure. By having all these side by side measurements, looking at the mix of species which you measure in these more complex procedures, perhaps you can try to pick out one from a limited number, much like ozone was picked out as a surrogate for photochemical oxidants some years back. Then we use what will emerge from that as a means for deploying this relatively simplistic measure, you're likely to get some health effects studies that carry over.

MR. McKAY: I'm just going to probably echo pretty well what all of you have been saying. But I think we're looking at these specific sites. The question is, is the accountability issue the same. Regular routine network of monitoring, and you have accountability there. The question is, what are we going to be accountable for, and can we measure that. If we can, can we use these super sites to do the research in order to get that. An example being people back to organics. We're saying organics is probably

something, but we don't have a real good handle on it in a routine site. So, is there something that can be in six or seven super sites where that's a research objective to develop the methodology and the measuring techniques to do the objectives. Then that's the accountable, fits into the accountability. To say well, in order to be accountable, we've go to know organics and look at the trends and we don't know that and maybe we can just... I mean the big problem, that I see, is that you know, the administrators and the policy makers want all that information yesterday and we don't have it. We try to always be, end up putting the cart before the horse. I mean it would be nice to have six or seven research sites to do a lot of work, to try to figure out what are the real things we want to measure and work with the health community and then you say once we've got a better idea of the processes and what we need, then you can build the big monitoring, the larger sites networks to do that. But we don't have that luxury for doing that. So, I mean the big thing is how can you do, given the time frame we have, to do the best we can and build on using those research sites or super sites. I think the thing the super sites, what you want to do, is try to build those super sites where you're going to have them in areas where you're going to learn different things. No sense having six super sites that are all going to tell you maybe the same answers. You don't

need six identical, if that was the case you'd only need one of them. The idea is to plan them. Where are the areas, I mean, I think you're trying to do that. Where are the areas that you're going to find some differences or you see some differences? Again look at these pie charts that you showed today, some areas where you have a pretty good idea of what all the constituents are that make up. There's some that you haven't gotten to. That maybe gives you an indication of where you might want to put some of these super sites. One of the things that I've talked to my people, well, look, you know, the idea of a super site concept is a good one. We're thinking of doing very extensive measurements in Canada and we're saying, well, there's no sense in looking at your super sites for example and saying, well, we'll mimic the same thing in Pittsburgh just outside of Toronto. We'd probably want to do a lot of similar things, but what is something maybe unique from the Canadian Center, or cold climate, not Canadian but maybe a colder climate, that you people are looking more at a warm southern climate that we would want to do and we could augment. So, certainly we want to work collaboratively as you said and as Gary was saying this morning, looking for partnership, is to look at what, how can we work together. One is the idea of the instruments, techniques, looking at the different ones we might be using in Canada that you're using in

the States and the comparability. Then the second thing is looking at it, is there something unique that we have in a colder climate, that we should be looking at and collaborating on that, on the super sites as well as our routine measurements. Certainly the emissions mix is one of the key factors down the road, based on these sites. The thing is to characterize a reasonable grouping of emission mixes that represent a large fraction of what we typically find in the majority of the sites in the U.S. My guess is you could get away with five sites. You need...

SPEAKER: I don't think we've assumed that the same measurements are going to be taken at all sites. There are areas in the country that are uniquely different and they're going to dictate where a great emphasis of those measurements are either developed or used. That's true of the routine program as well. But one of the things that, I thought what we might try to do is get a little bit back on track, in terms of trying to get some listings of measures that we want. What I'm trying to do is, but there are a couple of categories that have come up. The categories of measurements, in terms of ambient measurements, we really haven't gotten to that. I think you did want to get to the health endpoints at some point. Also the general category of this intersection between the super sites program, the routine program, using this as a

mechanism to improve some demonstrative effects of the routine program. We have a few measurements, a few ambient measurements, specific organic compounds, trace metal sources, soluble transition metals, ultra fines. Measurements that are not typically captured under the routine program, in terms of an augmentation sense, that the super sites program would help out. I think we need to embellish this list a little bit and try to draw some of that out from this audience. I can certainly add some things, but I think we really want to draw them out.

MR. WEST: Meteorology.

MR. SCHEFFE: Okay. This is where, let me throw this out with meteorology, to what extent, understanding the concept of accountability and the air program banishment, how do meteorological measurements fit into that. Certainly meteorological measurements are an absolute necessity for these super sites, because we're talking about resource receptor relationships, we're talking about evaluating air quality models and everything else. But in terms of tracking, I guess that wasn't fair to put that up there. I mean if you want to discern any kind of a trend signal, you have to be concerned about meteorology.

MR. McKAY: One example, I guess one example is for meteorology, long range transport that's causing your problem or is it local? That

certainly can, if you're in a valley situation, certainly the great end of meteorology is going to have an effect on that. Unless you're looking at meteorology in a different...

MR. SCHEFFE: No, no, we're not. I think what we're, Ken help me out here, but I think what we're trying to do is look at accountability in sort of a discipline where we're tracking whether, you know the types of measures that we put in place are really working.

MR. DEMERJIAN: The only place I see meteorology factoring in, is if there's a need to address trends or meteorological effects. I mean when I think of meteorology, I think of using what exists, in terms of temperature, humidity and stuff like that. If you're talking about a three dimensional Doppler radar in terms of standard three dimensional flow, that somehow that's going to have value in this accountability paradigm, I don't think so.

MR. WEST: And the other extreme is attenuated power, which is...

MR. DEMERJIAN: Well, again I guess the point is, what are you going to use the meteorology for. If it's, if the information that you're dealing with is more, almost chronological in nature, not so much chronological, but is, is the standard current with things used to make corrections, in terms

of data, then that meteorology exists. If you're talking about that you want to do individual trajectories of episodes and try to understand the process science behind those and you want meteorology to support that, that's great, but that's a process problem, it's not an accountability.

MR. MEYER: Would it not affect the exposure though? If you're interested in trying to tie this ultimately into medical effects...

MR. DEMERJIAN: Sure. You mean when they have the windows open or whether you go...

MR. MEYER: Whether or not you need be worried about stuff that's aloft because people aren't exposed to it or what? I mean if you just...

MR. DEMERJIAN: I think the network is on the ground, it's on the surface. So, if there's stuff...

MR. MEYER: You have 24 hour measurements, perhaps then maybe, wouldn't you want to have some kind of an explanation, I guess, about shorter duration measurements, why you're seeing what you're seeing? Maybe you wouldn't, I don't know.

MR. DEMERJIAN: Well, I mean, again in the context of this exercise, I'm not sure that's a driving force. What I find more of a driving force is one, making measurements every sixth day, when you know, you can look at data and you see that one

episode in that kind of a month's worth of data, which has every six day data and that one episode can have a huge impact on the mean and the standard deviation of that monthly average. To me that suggests that that every six day isn't going to do it for you. So, you'd better start thinking about getting more frequent types of measurements, until you get that standard deviation down.

MR. MEYER: I understand that, but it might be somewhat easier actually, in the routine networks to measure meteorology. If you knew exactly what's measured and what sort of meteorological variable might correspond to some of these toxic species that maybe are getting lost when getting next to the ground. If you're interested in accountability, ultimately relating this to some kind of health effect, I can see maybe the role of meteorology in who's held accountable.

MR. COOK: Ken, are you not asserting that meteorology, the effect of meteorology on a year's value?

MR. DEMERJIAN: No, I'm saying that, I'm saying that any given individual event is not what ultimately what will be processed in this accountability exercise. I am interested in, for example, if there's major climatological variability from year to year, that it impacts the loading in terms of, all

of the things would have a potential impact on the gross emissions, as well as potential, I mean if you had a situation where it was an exceptionally rainy season, it might have certain implications in terms of PM, or exceptionally hot or exceptionally cold. All of those things have implications both on the air quality measurement and on the emissions. That you do have to have. I guess what I'm saying is that I would have a tough time saying that we need a three dimensional Doppler sounder at each of these sites, because we want to know the three dimensional flow of the winds, because that's going to be incorporated into this kind of accountability exercise. I don't see how that could legitimately be brought into play. Now the suggestion is, maybe there's a lot of upper level stuff that could be interpreted, if you have that kind of information and maybe that's so.

MR. MEYER: To change the subject slightly and that is, given that, I guess we have a fixed budget for this super site network. Has there been some allowances made for data analysis?

MR. SCHEFFE: Yeah, quite a bit.

MR. MEYER: It seems like one of the things, and this does relate to accountability. You're probably going to be interested in topics of mass associated with sulfates, what is the mass particularly associated with organics and so on and so forth. Is

part of the data analysis that objective, to try to figure out, if you measure sulfate, what other species are associated with that, so that you can contribute some kind of mass portion corresponding sulfates to...

MR. DEMERJIAN: My feeling is that there needs to be a set of tools developed, diagnostic tools that allow you to do that kind of partitioning, try to understand the partitioning of ammonium across sulfate and nitrate. Is organic carbon part of the pie, I mean you saw some data here that suggests that there might be a water component to the organics, that really hasn't been looked at. So, there's a bunch of those issues. Now the one, I guess one of the questions we can ask, as part of our charge here, is that, do we want to identify development efforts or some of the basic tools that handle the analysis approach, that should be considered, in terms of trying to implement this kind of accountability scheme. We can do that. The other question is, I had, down at the bottom, is what should be the air quality modeling systems, what role should they play in this exercise. They could provide some insights into this, but so could observational data tools. Should we be thinking about the development of observational based tools to address some of these issues, like the partitioning of mass, etc. Those are all things that should be considered at some point.

MR. SCHERE: That brings me back

to a comment on meteorology. With the larger accountability, as it's been defined, as you would define it for NARSTO doesn't bring receptor models, emissions based models and if you bring that into the picture of accountability and obviously meteorological, plays a whole larger role in that sense.

MR. DEMERJIAN: I guess where the question comes up is, is the role here, is meteorology required here, any different than meteorology that's been required for trying to deal with the ozone issue. I know that discussion is, if you want to run an air quality model, you need something more than 10 metered power data. But the question is, is this the network that certainly six sites are going to make a difference, in trying to deal, if you're trying to put meteorology in these six super sites, and that's going to be basically the basis on which you're going to now run an air quality PM model, I just don't get it.

MR. SCHEFFE: Something you said a couple of minutes ago, which is related to meteorology and air quality monitoring. You made a comment that you're getting into a process issue, and that's not sort of the domain of this accountability. Maybe we should rethink that a little bit, because I'm thinking in terms of, there's this dilemma here where we think of accountability, long term trends, things that are sort of appropriate to measure, with routine methods and so on

and so forth. But what about, don't we want, doesn't it, from an accountability standpoint, don't we want to be able to answer the questions, why a specific strategy didn't work and to get at some of the whys, don't you have to get into process types of measurements?

MR. DEMERJIAN: Yes, but that's part of what the groups doing process work are supposed to be unraveling. If we try to do everything here, then basically this becomes the crux. This whole program is hinged upon this. So, I would claim that, our job of identifying the lack of response, as expected, okay, then goes and requires the science community or the process community to come and try to provide the various underpinnings or rationale for why they think that happened. So, we need to have the basic framework for getting us to that stage.

MR. MEYER: Are you suggesting then that doing diagnostics, is not a part of the charter?

MR. DEMERJIAN: No, I think diagnostics can have a role here, it's just a question of do we claim that we're going to be developing process science, within this context or are we going to ask the diagnostic tools be considered, that allow us to do accountability problems, that we're not the ones to promulgate their development.

MR. MEYER: So, our role basically

is to just detect whether or not there seems to be a problem with what our expectations, about how effective our strategy may be?

MR. DEMERJIAN: How the monitoring data can be used to do that. How you would actually use the monitoring data to assess various perturbations that are a result of actions taken, and to be able to show that you can get the response you expected. So, the set of tools to be used, I mean, it's a question of, you develop the tools to do that, or are they tools that you take off the shelf and do that. I mean one of the things that I'm talking about, they're simplistic, they're basically taking the data that's available and the monitoring data and the emissions extraction data and putting them together. But the fact is that it hasn't been done in any reasonable systematic way. Just doing that would start a process. Now you may find out that once you've done that, that other questions come up. Like the question I mentioned about the fact that there doesn't seem to be a one to one comparison for incremental change in C0 emissions to be C0 observations. You might want to look into that and find out what the explanation for that is, and whether you need a different way of taking subsets of data to interpret. The one advantage of being outside of a local source perturbation area is that as long as the stuff eventually gets to you, you probably have a

better handle of capturing the impact, than you will at any local area that has the chance of sources moving around it, or moving away or fluctuating back and forth. If you're far enough away from the problem, then usually what you're monitoring is the whole problem, the change in the whole issue path. That is an advantage of being sitting out in a rural area. It doesn't make the health people very happy, because they're not interested in, or at least that's not where the people are. But in terms of understanding the cause/effect relationship, with regard to emission and air quality, it's a nice place to be, sitting out in the middle of nowhere and catching the fetches from these perturbations. So, that is an advantage to being in a rural site, but we're going to have to do these things within the urban environment as well, but we need to recognize that sometimes the changes that we anticipate, may not occur at the same magnitude in that urban center, as we expect, because it's occurring way out and further out, out of the domain of influence of that monitoring site. So, that has to be brought into the formula as well. Whether you can think of clever ways of using traces to separate those differences and all that, I don't know, I haven't really thought about it.

MR. SCHEFFE: But Ken, let me...the process of diagnostic types of measurements, including three dimensional meteorological profiles and things

like that, are relevant to this accountability. But the scope of those measurements is beyond the scope of this group, because it's something that ought to be flushed out and scoped out in perhaps a source receptor or quality modeling venue. Is that fair to say?

MR. DEMERJIAN: Yeah, I mean the fact is the people that are doing source attribution, to some extent, have to play a role, they are playing a role in accountability.

MR. SCHEFFE: That's what I'm getting at and I think what we need to do is show that there's a linkage there.

MR. COOK: Rick, I think it's more than that. I think this is a direct, relevant, measurement related, train related feature, it is key to doing the trends. This is what accountability is largely about. Yes, it is important to those other areas.

MR. SCHEFFE: Jeff, no, I'm not disagreeing. What I'm saying is, I think where Ken's guiding us is, we don't need to put things like hydrogen peroxide measurements or peroxide radical measurements in this accountability list. I think what Ken is saying, that those are parameters that will be brought up in a process group, the source receptor analysis list and those measurements that are needed to diagnose whether things are working for the right reasons, are a part of any accountability scheme.

Flushing out those individual measurements isn't something we need to be doing here.

MR. COOK: Is it conceivable though that they can come up with a paradigm for meteorological measurements, that would have no value, no relationship or bearing on doing any of the trends than just in type of routine measurement sites? It seems that this is a feature of accountability, almost solely of accountability. While you may have source receptor event, you may have transport event, you may have all these other events that aren't important to trends. But to be able to coherently look at a trend over time, for the purpose of explaining the relationship of controls and effect, to me seems squarely on the shoulders of...

MR. MEYER: Much of the more main trend analysis, is analysis for the trend parameter that you normalize for meteorological.

MR. DEMERJIAN: It's only ozone, right, Ned? There aren't too many other examples, I don't think.

MR. MEYER: There might be here, when you're talking about...

MR. DEMERJIAN: You're right, but I guess what I'm asking is, those trend, those adjustments are very simple meteorological measurements basically. In this case it might be

temperature, humidity and possibly, I don't know precipitation might be a factor, in terms of looking at wash out or something like that. I guess, I guess the only issue I see is that if it turned out that dependent on the super site providing a certain specific information that we thought was going to provide insight on how to augment the network, and then we found out that that super site was influenced by meteorological conditions that were substantially deviant, that is the particular year we were all measuring had nothing to do with the average year...

MR. MEYER: Suppose you learn that some of these extra chemicals that you were measuring are more affected by a certain meteorological condition than others? That might influence your decision about whether or not you measure that chemical.

MR. DEMERJIAN: Let me ask you, what are the meteorological conditions that aren't being measured that you feel will influence...

MR. MEYER: I don't know, deposition, is that being measured?

MR. DEMERJIAN: You mean in terms of aerodynamic turbulence, is that what you mean? I mean you'd have to sit down and do any correlation and get something on the vertical turbulence or...

MR. MEYER: Is that a potentially important factor?

MR. DEMERJIAN: Well, I mean, the thing is that it's hard to imagine that that would be something that would vary so dramatically over...

SPEAKER: Did they do analysis over longer periods of time, with different integration periods?

MR. DEMERJIAN: Does who do that?

SPEAKER: Do it in terms of process measurements.

MR. DEMERJIAN: A lot of people do things like that. I'm not sure if that is all that useful for a trend analysis, that's all.

MR. SCHERE: The value of a lot of these meteorological measurements that are being discussed, would be at the operational sites, not at the super sites, where you have this over a long period of time. We're talking about certain meteorological at the super sites, which are more research oriented sites, where measurements may change from time to time, the primary value I would see there would be in relation to source attribution experiments perhaps. If you would do them to perhaps prove a concept that might be applicable to the operational sets later. But the trends I think we're talking about long term meteorological measurements made here at an operational site, a concept or taken from the nearest national weather service or operational meteorological site, which is the

standard practice now.

SPEAKER: I think that's Ken's point, that those data are available.

MR. WEST: Let me see if I can add to the confusion. I guess, the perception of what the purpose of these six or seven sites are, I see as purely research sites where you have all sort of instrumentation, might be different instrumentation week to week, it depends on what's going on. But if you're getting, I don't think these are trends, as a matter of fact they might even be mobile, you have to move them around every three months. So, we're not talking about long term measurements at these sites necessarily. The instrumentation may change every three or four months, but if you're, if I'm looking at a 24 hour period, an hour to hour period of readings, not seeing spikes or no spikes or whatever, I may want to know whether it was sunny out or if it was raining out, if the humidity was high, whatever at that site, to know, to help me analyze that data set. That's my...

MR. DEMERJIAN: My point would be that what's required to interpret that data, is going to be driven more by the process scientist, source attribution. They're going to ask for way more, than we would need, in order to interpret that data. We're looking at that data, in terms of introducing new, looking at these sites as basically introducing new

technologies that will help embellish this network of operational sites, to make our capacity to do this accountability problem better than we are without that. So, I guess my point is, I read Ned's comment as, in terms of the operational network, and if we're going to do this type of accountability exercise and trends, do we need to have specific meteorological measurements embedded into the operational network, such that it will help us to do this accountability exercise.

MR. MEYER: Actually no, what I was trying to say was that, let's say that dozens of additional measurements you could make, but some of them maybe are unstable in some way perhaps due to some kind of meteorological condition. Perhaps they may not be as suitable to ultimately be considered in the operational network. If that turns out to be the case, maybe, you know, we're going for things that are somewhat less subject to wild fluctuations or changes, with some kind of accompanying change in meteorology.

MR. SCHEFFE: I think it's just, it's on this speculative level.

MR. MEYER: Sure.

MR. SCHEFFE: Some things are. I mean some things, we know we're not going to have a constant record of speciated organic compounds in a routine network. We do know that that's going to be important to trace back to some of the emission control

programs. That's one clear way where these super sites can help us. I don't think that's speculative. The same thing with the ultra fines. But with the meteorology, I think that you get a little more speculative. There's a lot of grayness here in terms of the relationship between what's done in accountability versus what's done more in the process group. I tend to, I have a disagreement with Ken on this, but I think, you know, I'm just following his lead here, in terms of begging away, moving away from not recommending specific process types of measurements, with the understanding that those are going to be, that those recommendations would be subsumed by another group anyway. I think that provides us with a little bit more focus, because we'll detect in terms of what realistic things we can do to augment the routine programming. So, I see a couple of big categories. The one big category, in terms of improving refining on the technique, specific measurements, and I don't think anybody has been convinced that the available meteorological measurements are not enough to provide, to delineate the emission signals from what other signals are out there.

MR. DEMERJIAN: One other thing that we haven't actually touched upon, maybe it's worth bringing up, is that obviously the give and take here is between emission and air quality change. Of course

we're all assuming that the emission estimate that we're getting for the control that we're talking about, that that process is valid. As I mentioned with the CDM there's at least now a database of actual real time monitoring that you can tie down to an emissions change, that's measured, whether than one that's estimated. Some of the things we've talked about, in terms of the implications of the control programs, for example let's say the diesel particulate, there is, we called some numbers, the question is, do those numbers ultimately come out as we'd expect, in terms of the emission estimate. How good is that estimate? How good is the PMT estimate, etc.? We haven't really talked about that and whether that's part of our responsibility as well, is to make sure that the emissions estimates are at least up to snuff, because they are actually one of the components that we're supposed to be comparing against. I mean certainly an issue with, if we had real time, if we had a good systematic database off organic carbon trends in this country, it would've been very interesting to see if the estimates that we had for mobile actually bore out in terms of the air quality trends that would've been there.

MR. SOMERS: You mentioned how good the PMT is. Another factor you just alluded to is how good are the emission factors that we use in the hard fine model. The normal model is different from the

hard fine. When you're taking the ambient measurements, you've got this category to this category, this category, does all this add up? If the sum of the little pieces doesn't agree with what you're finding in the ambient air, the problem could be one of the little pieces, and today you should be able to find out which one it is. But if you put tracers in there, you might be able to eliminate some problems.

MR. PIETARINEN: I've asked several times in seminars on data analysis, exactly how long ago did that do that? I haven't seen it done too well. I personally have never seen it done satisfactorily. If you want to, I think looking at emissions, you need a full strategy to take into account a few pieces of this whole accountability issue and also with respect to the accountability of this program itself, then you have to follow the science. You take the data and say here's what it tells us about emissions information relative to specific areas. Going back to an earlier comment, you of course need timelines and milestones.

MR. SOMERS: Yeah, OAQPS personnel have done this a little bit in their trends analysis, that you were mentioning before. You look at data driven air quality measurements and the difference in air violations and you look at your information by inventory, which is a great resource for your area. They ideally should be consistent. If one goes up and

the other goes down, then, you know...

MR. DURRENBERGER: Well, one thing that we've done is we've looked at the content of benzine in gasoline and we looked at what happened when we put repumped gas in Houston. We could see that show up. The benzine levels monitored clearly the difference. So, we could definitely see that.

MR. DEMERJIAN: You could do that in New York as well. The thing that would've been great if the program was in place, is when in the northeast they implement the REP change, see that incremental change, which there probably was a change, it's just that there wasn't a lot of the city data to demonstrate it. We have some data that would suggest that it changed out in the rural areas far away from these cities that were implementing the REP. The interesting thing there is that not only do you see the expected change in the hydrocarbon burden, but then did it have the effect, the response you expected. Again meteorology becomes a big issue, in terms of the....

MR. DURRENBERGER: We're starting to look at some things that deal with specific carcinogenic emissions to see if we can see a difference in that data from '93 on. So during that time...I don't know whether we're going to pull anything out of it or not, but we'll see what we can ascertain

from that data. But two sides, it makes it, statistically you don't have much, many sites to look at, and then you have to worry about other complications. For example, is it a refinery you're seeing instead of gasoline operations, et cetera. There's a lot of complicated issues Another thing we have looked at is the hydrocarbon/NOX ratios versus mobile source, and we've shown there's a big disconnect there. Something's wrong. Now how does one make that adjustment, I don't know. That's the tricky part, how do you take that and modernize it?

MR. SOMERS: But when you do that, and you look at your HC and NOX ratio, also look at your HC composition and say well, this is a complex issue, what's my inventory. My understanding is that the disconnect tends to be in your total molecular hydrocarbon, your C5s, C6s...

MR. SCHEFFE: Well, one thing we've found is that, an elemental profile for gasoline, showed up more clearly. You have to make an adjustment on that, a different composition profile. That did change with time and that was due to the change in augmentation. So, that was something that we looked at. For example, we found so called wild gas in there. Where in the world does that come from, I don't know.

MR. SOMERS: That tends to be, you

know, atrophy that comes with the running process.

SPEAKER: The classical mobile model though doesn't show that much. The question is, is there some other source we're not accounting for. The other thing we're accounting for are FM calibration. Where is that coming from? Once you measure it, you know, the question is, does that play a role or not?

MR. SCHEFFE: Let me just try to state the obvious. You can't have an accountability program that tries to track the ambient environment back to emissions, unless you have a pretty darn good handle in terms of those emission...

MR. SOMERS: Tracers.

MR. DURRENBERGER: Tracers.

MR. SCHEFFE: Yeah, and it's probably not something that this program funds. This is an ambient measurement program. That is certainly something in terms of synchronization and coordination, that has to be addressed. I think it's something that our accountability group, that we have to make mention of.

MR. SOMERS: What you do is you go through the access committee for source apportionment and find what tracers do I have, am I showing, that I need to come up with, things like that.

SPEAKER: That's still within this program here. I was actually thinking beyond that, that

this, in terms of the emissions measurement programs that are out there, that should be synchronized with these super sites to a certain extent to enhance the ability to look at accountability.

MR. DEMERJIAN: There is the potential of doing reconciliation with the data, to possibly get at the gasoline versus the diesel component. I don't think anyone has done that yet, but it's potentially there. So, there are some tests, there are some data analyses that can be done to compare some of these things. I think also, I mean it's obviously not the subject of this meeting, but what we've been discussing what might be of some interesting way to actually track the issues for direct measurements, possibility if you ever want to get serious about getting a handle on some of these problems it's down the road.

MR. SOMERS: Some tracers exist at different level sources that we know about and others exist that we don't know about.

MR. DEMERJIAN: Unfortunately, for human mapping, it wouldn't be a good tracer.

MR. FERULLO: Rich, didn't you say there was a data analysis portion of the budget for super sites?

MR. SCHEFFE: Oh, yeah, just on a parallel track, there's a lot of discussions about how we administer this program, in terms of what we do with

funding and we're going to, we're consciously going to separate a pretty large fraction, probably 20 percent of the resources just for data analysis and interpretation.

MR. FERULLO: How did that get into the accountability issues?

MR. SCHEFFE: Well yeah, it can, but again talking accountability, I'm talking about 20 percent of a budget that I know is going to last for a couple of years. I think for accountability we like to think a little longer in time.

MR. DEMERJIAN: I'd like to mention the, I've got to get together with the other group leaders and they've asked us to fill out this worksheet and we've actually touched upon many of the things here. But there are two items here that I don't think that we've discussed in any kind of detail. Let me just say this, instead of science questions and hypotheses and this accountability, I have no problem defining what those are. What's species and parameters need to be measured and I think we've kind of flushed that out as well, in terms of the ultra fines and the organics. I guess my point is I personally don't think there's a need for shopping lists. If you feel differently, if you want to put together a shopping list like the ones the health people, as far as I'm concerned we're going to go no place with that. We need to be realistic. My bottom line is I think that there's some targets of opportunity

that are being measured, that we can then use to process.

SPEAKER: So what's the required number of ultra-fines?

MR. DEMERJIAN: The idea, at least my understanding of the idea behind ultra fines, is as this new technology like the gas driven bus comes into place, ...

MR. SOMERS: New technology diesels.

MR. DEMERJIAN: Yeah, new technology diesels...

MR. FEGLEY: To see what's going on?

MR. DEMERJIAN: Well, the idea is that yes, the ultra fines might go up in this PM2 carbon come down, that's a hypothesis at least that I think John was pointing out. I mean, I don't know.

MR. DURRENBERGER: But tracking in the trends, that's the important thing. Just having the data in the file cabinet doesn't do you any good. You have to see what happens to it.

MR. DEMERJIAN: What we were trying to do is identify what would be the types of perturbations that are going to occur in the next five years or something and see what would be the indicators we would try to track.

MR. FEGLEY: But we think we would be able to see a urban diesel, new diesel signal in the ultra fine measurements over time, relative to some other measurement? Once we have the data, are we going to be able to do something with it, that's the question?

MR. MEYER: I have the same problem with ultra fines. I can see wanting to do that, the major objective is you really want to change the standard to reevaluate the standard. But in terms of accountability, the controls, I can't imagine that they would contribute very much.

MR. FEGLEY: Not until they get to this one specific...

MR. DEMERJIAN: As I understand it, and I agree with you. You're right, as far as the accountability, it would be a tough sell. I think John was, it's probably something he wanted to bring up in the health effects group, which is, if there were such a switch and the ultra fines were thought to penetrate more, that could be a negative response from the health perspective, as a result of what we think is a positive response to dealing with the particulate problem. Therefore it should be something that they want to think about. You're right, I agree with you. To try to put it in this paradigm, doesn't make good sense.

MR. SOMERS: It's an indirect

accountability issue. What you're saying, it's not a real direct one, but still, there's a whole bunch of things coming into play with the diesels,...

MR. SCHEFFE: But the other way, it would be a shame if they found out that one of the health endpoints is closely associated with ultra fines and that you didn't make those connections with ambient measurements. Maybe it's very difficult to make the connection from the source to the ambient, but normally we go from the source to the ambient. It's very rare that we have the ambient to the health endpoint. Maybe that's just an odd case. So, I...

MR. DEMERJIAN: Other than the fact that maybe a consequence of this emissions change that we're talking about and that we think it will be an interesting result to see if we saw that a change, in other words it's another parameter to measure that would be indicative of the action having taken place, that is the control program taken place, but how it fits into the accountability as the current packet is written, or how the PM2.5 standard is written, it doesn't. But it does give us some indirect information about the response of the system to the emission control and to that extent, if it were there, we'd certainly try to factor it into our analysis.

MR. PIETARINEN: I guess I have this question since the health effects thing came up at

the very beginning of the session and that is, measuring hospital admissions for asthma, the deaths attributable and all that, and that's easily one way of getting at this. But I remember there was work done a few years ago, in looking at other indicators of biological activity besides that, and there's a lot of difficulty, there seems to me, in doing a direct relationship between what's happening with particles and is that, what other covariants are interfering with that end health point. Is there some interim measure of biological activity that can be done, we think always about chemical measurements, but are there biological measurements that help get at that. I know as an example, you're from New Jersey, they ran part of Pennsylvania's test. But there may be other tests available that kind of give you that. Moving towards answering that question, is what we're controlling reducing the toxicity level?

MR. SCHEFFE: Well, that's the $64,000 question.

MR. FEGLEY: Well, I think that's what we're doing. We're trying to figure out right now, now that we have those incidences right now, those biological incidences.

What's going on here? Because there's more, there's a lot more going on here.

MR. DEMERJIAN: It would be

interesting to see if any of those things end up as proposed measures from the health folks. I guess that's what we're suggesting. Because that at least would be one component of this quotient. I absolutely feel that if you truly expect to be able to be accountable to the public, you eventually have to show them that they've benefitted from this action, in terms of less people going to the hospital for whatever. I mean asthma may be the worst damn thing to use because the influence by so many other factors, that have nothing to do with PM2.5. If that's all you got right now I guess, at least from what I'm seeing, it seems to be all we get.

MR. COOK: I'd like to go back to something Charlie raised a bit ago and that had to do with emissions inventory in the PAMS program. The PAMS program is not a super site program, but it goes for things that are also raised in a supersite program, and is there any value in going back and looking at the successes and failures of that program, in being able to meet its objectives and to say where it failed are areas where we need to either increase the accountability or to make sure we don't make those errors again, so we can make statements like that. Is there a, would it be of value going back through that?

MR. SCHEFFE: Of course there's value in doing that.

MR. DEMERJIAN: There has been some attempts to convince OAQPS to...

SPEAKER: And we're doing it.

MR. DEMERJIAN: They have reacted, it's taken them five years, but they have reacted...

SPEAKER: I wasn't here five years ago.

MR. DEMERJIAN: I think, I made a proposal and actually it's part of this working paper that we did for NARSTO, an assessment on networks. I suggested that there really needs to be a feedback mechanism between the operational community that's running PAMS and the state organizations, sets of tools that identify how they meet the needs of the user communities they're presumably doing these measurements for. In a routine gathering of these people together, in being put into, being dividing into centers to exercise the data to demonstrate how it meets the objectives, because it's only through that process that you really find out you have or you have not done that. Too many examples of states that just dump the data into air and that's it, they never look at it again. It happens a lot and I don't think it's because they're careless, I think it's because they see no reason to spend time to look at it, because it's not built into the process of why it's important to be making

these measurements, how it fits into the context of what they're obligated to do down the road. So, I don't know, I had a whole list of things, recommendations of things that should be considered as part of, it's almost in a sense, it's a combination of retrospective to how in the future, in essence to enhance the value of the PAMS program, in terms of getting better information and getting it utilized and into the communities that need to take advantage of it. That's, I think it's very important and I think there's a lot of lessons to be learned from it, because I suspect if we don't learn from those, we'll make the same mistakes in this new network.

MR. COOK: Are those the kinds of recommendations that AVEA should be thinking about making?

MR. SCHEFFE: Yeah, absolutely.

MR. DURRENBERGER: Ken, one of the problems with that, is that it's not frequently required that that get done in many cases.

MR. DEMERJIAN: You're right.

MR. DURRENBERGER: I mean you know, I don't know how other states are, but our state they sometimes say hey, where's the requirement to do that. If we're not required to do it, we're not going to spend the money to do it.

MR. DEMERJIAN: That's exactly, certainly true.

MR. DURRENBERGER: To do anything.

MR. DEMERJIAN: Their obligation is to collect the information and deposit it.

MR. DURRENBERGER: That's right. The obligation is to do that, and there's not obligation to do any analysis on it or figure out what it means...a lot of us would like to do that, but...

MR. SCHEFFE: You're absolutely right and one of the things that have come up in the new standard, I think we've formally, if I remember talking with Mash, that the PAMS data formally are going to be used to track emissions changes. I'm always surprised and amazed when I hear what you're saying, because I think, ah, no, but it's reality. One of the neat things, if you think about the visibility program, the approved program, it uses monitor data to assess any kind of progress and any kind of change. It doesn't use emission estimates, doesn't use models, it actually uses measured data. The matrix based quantitative matrix, based on those measured data and I think that the newest,...Lee, what context is that brought up in?

MS. BYRD: That's not a requirement at this states, that's part of the guidance document for the eight hour... I don't think there's still a requirement.

SPEAKER: Okay, it's still, probably doesn't have the legal clout you're talking about.

MS. BYRD: I think the super sites program though, I would assume before anybody got a super site at all, as part of whatever proposal has to be put together, that their data analysis plan, why they want the data and so on and so forth, will be part of that. We'd be boneheads to do anything short of that.

MR. DURRENBERGER: If that were part of it, it would be done.

MR. DEMERJIAN: Jeff, I'm not sure if I cut you off. Are you suggesting that we have here as a recommendation that we can use the PAMS as an example of a place where we can actually exercise data in the way the, how it might play a role in accountability to provide a template or demonstration for how it might work in PM2.5?

MR. COOK: I think in a way, the failure of charting out the objectives and what has actually transpired, is that I would categorize that as a failure of accountability, whether it's poorly designed objectives or lack of will, interest or legal requirement to do it. But there's something that's grossly subutilizing those data and I think that's an accountability issue. We use that paradigm and project, but we're trying to prevent something like that from happening again.

MR. DEMERJIAN: We agree.

MR. COOK: I just have one other thought and that is, in terms of using ambient measurements to say anything, clearly one of the things that you always have to be very attentive to is the variability. I'm talking about variability in the measurements themselves and the methods compatibility and so forth. This is maybe another level of this thing we're talking about, but it just seems that any program that doesn't, that tries to answer questions without understanding the variability in those measurements, among those measurements, is really kind of charting the course to trouble.

MR. DURRENBERGER: You mean spatial and temporal variations?

MR. COOK: You name it. You name it. We have five super sites and four methods for measuring nitrate, then we have the same nitrate number. If we have a set of assumptions that remain representative of one super site, maybe one area, does it apply to another area, or do you need to test that variability. Variability in precision, use all elements, because they all come to play when you use them. If you don't understand that, then you can't describe it. I think that you have much less clarity, must less certainty when you go to make statements. This caused this effect. Somebody comes up and says what do you

consider this...

MR. DURRENBERGER: And that's where your meteorology plays a role in trying to back up that variability.

MR. DEMERJIAN: I understand. I don't know if you've gotten any feedback on this. But at least a couple of people that have been running the samplers side by side, to meet this federal requirement, have to agree within 15 percent or something. But that hasn't turned out to be working out so well. Variability between two samples is a procedure that doesn't....

MR. SCHEFFE: You're talking about the UPM?

MR. DEMERJIAN: Yeah...yeah.

MR. SCHEFFE: And there's a lot of sampler, sampler operation difficulty because we've had a number of comparison studies where we had basically experts running these instruments side by side and the variability was very, very small. It was incredibly small. So, there's a lot of operations. That's the problem with filter based mediums, you can have all sources of variables.

MR. DEMERJIAN: I'm just telling you what I heard. I mean you know, when you say you had experts running it, it's an automated instrument, they're supposed to be able to turn it on and get a measurement out of it.

MS. BYRD: But the majority of the air isn't in the instrument, it's in the filter handling side. There's all kinds of air getting introduced. Getting back to Jeff's point, from what I've heard today, is the different super sites, the locations they can potentially measure different things. And very well they have, the same three broad objectives that we've outlined. They also have some very specific objectives associated with those sites. Is there a need to take the recommendation of accountability measures, that are very specific to that site, so that there's some basic understanding that what happens, what results from that location may not apply everywhere else and we need to understand what the objectives were, what we expect to get out of this location.

MR. DEMERJIAN: You're again back to speaking to accountability in the terms of the objectives of the super sites program, and not in terms of the full context of the air quality management program. I have no problem with, of bringing up this issue of accountability within the constructs of the PM2.5 super sites program, but it's not what I put together to talk about here. What I took, what this is about is how does the whole air quality management process for PM2.5 become accountable to society as we move down this path of, this new standard? With the new networks coming on line, how do they most

effectively get utilized to build this accountability paradigm. So, you're asking something that's more, I would call project specific. That is that every one of these teams is going to have a series of quote unquote, either hypotheses that they're going to test or objectives they're going to have for their programs. You're asking how will they demonstrate to us that they have been successful in meeting those objectives or answering those hypotheses and you know, it's not, I don't think that's what we're about. It's certainly something you should ask them, when they put up their program.

MR. MEYER: Following up a little bit on what Lee was saying, I think it is of some value to identify things which seem to be, seem to happen commonly to all six, almost all of these sites versus ones that are area specific. Because that might tell you something about what you should think about employing network-wide, in the more routine network to improve our ability to have accountability.

MR. BYRD: What about, if I might elaborate on the direction that you're coming from, eventually EPA is going to be in a position, once this rulemaking is out, of coming back to them in the budget and justifying the existence of this program and explaining what we got out of it. They're held accountable to that. It's not like research money, it's a

little bit different type of a thing. It doesn't seem to be very specific answers. The best answers are going to include things for that particular site, as well as for the general.

MR. DEMERJIAN: If I was in your position, I'd want to be able to address many of the issues that we're talking about, more than I'd want to address some of the objectives in those other meetings. Because those other meetings, in a sense, are doing a lot of research on things that are going to be important to understanding processes, but they're not going to make OMB all that happy about how it's helping you solve the problem in terms of PM2.5 management and the implications to the public at large and what they're going to be able to tell their constituencies, in terms of why we spent this money and why it was important, because it had this impact on the environment, saved this many lives or kept this many people out of the hospital, blah, blah, blah. I mean that's what the bottom line is here and that's why I think it's so important to this kind of investment and Rich has already heard this harangue, but it's amazing that we got away with PAMS and didn't get nailed for not having this kind of closure in that program. There was one other item here that we haven't talked about too much. Where should measurements be made? Do we have any specific requirements for measurements, in terms of the

context of this accountability? I mean I'm assuming these are measurements for the super sites. I guess as far as we're concerned, as long as they're in these representative regions, and I will say that to the extent that we can identify the commonalities of the measurements among the super sites, in terms of issues they're addressing, at a minimum we need to raise, to this broader community, that one of the things that we would like to be able to tease out of the data is the responses of these emissions changes that we're aware of happening in the environment and we hope that they will be cognizant of those, in whatever they plan.

MR. FERULLO: From an accountability standpoint, if there would be some sort of a preference to locate the sites where there's also health effects people are doing health studies, so that you can connect to the health effects.

MR. DEMERJIAN: We would definitely like to see that happen. Rich and I were talking about the fact that I think they had hoped they were going to have an inventory of all ongoing health effects programs that were, you know, either in the queue or on the way and that those would be part of the basis for selection of places.

MR. FEGLEY: That's a real big impetus for this whole thing. Trying to make sure that there's some overlay.

MR. DEMERJIAN: So far all that data hasn't come in I guess.

MR. FEGLEY: But I think...

MR. SCHEFFE: But one of the, even simpler than that, I mean, one of the assumptions is that these sites are going to be located in populated areas, urban areas and from a scientific viewpoint, you could argue that maybe you should be putting these in rural areas that are not subject to some of the concentrated sources. But I think in order to meet the needs of some of the health effects research, it just makes sense to put these sites where populations are.

MR. WEST: I think one of the proposals also would maybe be mobile.

MR. SCHEFFE: I don't know about that. I don't know how logical that is. I mean...it's a thought that somebody put out there, I don't know how practical it is. It's hard enough getting a site established. The types of expense put into these sites and in fact, Ken, maybe that's something that can come out of this report. If we're talking about accountability in the longer term and doing the longer term assessment, the concept of mobile sites perhaps is a conflict of that idea and maybe we need to point that out.

MR. DEMERJIAN: Some people would suggest that with the right employment of a

mobile network, you can actually, if you systematically retrace your steps in such a way that it's making a bunch of spatial measurements...

MR. SCHEFFE: I don't know.

MR. DEMERJIAN: The level of the kind of measurements that we're talking about here, stuffing them into an RV and rolling around town, it doesn't sound too good to me.

MR. SCHEFFE: But I think at the same time we can't be ignorant. If we find out that perhaps there's some redundancy or that there's not good use of the measurements in a particular location, you scale that down and move it some place else, you can't close those kinds of common sense...

MR. WEST: That would be common sense to do, right after you draw your sample.

MR. SCHERE: In terms of the relation to the health studies, I thought some of the measurements, many of the measurements that these super sites were going to be more pushing the envelope in terms of research and experimental type measurements, so that they would not be done for long periods of time or continuous, they may be bursts of activity. So, in any case, it may be difficult to relate to longer term health effects studies unless you're looking at focused, focusing on process and mechanisms of the dose response.

MR. DEMERJIAN: You know it's kind of interesting. I have the same feeling that we needed basically 10 year studies to do this epidemiology. But like the asthma study, not doing it for one year and of course they're tracking these hospital admissions in two different, very distinct locations, in terms of distinct growth, in terms of, I don't want to necessarily say distinct in terms of pollution levels, but certainly distinct in terms of socioeconomic class. There's a bunch of, part of the population is outside a lot and part of it is not. I was talking to the health people about this and I said you know, is this giving you a reasonable database? They said well, you know, it's not, they would like to do it for three or four years, but actually one year, they have this idea that they will get a reasonable amount.

MR. FEGLEY: Obviously it depends on whether you're looking at something like asthma or you're looking at long term.

MR. DEMERJIAN: I don't know if that's a great health indicator or not. I just know that that's one of the studies that's going on that I'm aware of. There's probably several others. Unfortunately that would be going on before any of this gets off the ground. It's supposed to start this fall. I'm actually trying to tweak a little bit about how they're doing measurements. I just found out about this in the last

month and so you know, there might be a chance to augment that with other measurements that they weren't considering. They're fighting to get the sites in place. The community has raised questions about why they're in this area, why they're doing these measurements.

The only other thing was sampling frequency and duration. There's something about intensive monitoring, which I think is less applicable, that we're looking for more routine systematic measurements. But I guess my experience has been, from the little bit of PM data that I've been looking at, I'm finding once every sixth day as not being adequate for capturing all of the features of the, what I think is the contribution of PM. The one example I have is, I've looked at a couple of years of PM data at Whiteface and what I'm finding is that there is potentially one sample in a given month, that can influence the mean in the standard deviation factor. It seems to be associated with episodes, it looks like depending on how many episodes you potentially miss by this every sixth day, you could be underestimating these numbers considerably. So, I'm, I definitely would like to see something a little bit more frequent. I don't know if it's once every three days or once per day, but...

MR. SCHEFFE: Well, let's face it, I mean every second is where we want to get to. I mean,...

MR. DEMERJIAN: For the accountability I'm not so sure you need to make that case.

MR. SCHEFFE: No, no, I'm...

MR. DEMERJIAN: It may be an issue for health.

MR. SCHEFFE: But you really do want to, I mean you're going to want to, every sixth day, every three days may not be enough. To the extent that you can move to automated continuous measurements, probably at that no cost loss, I mean that helps in terms of accountability as well as some of the processes. So, that's a point worth making, that even for trends types of accountability measures, more frequent sampling is desired.

MR. PIETARINEN: I would agree. The move is towards, you really want to move towards automation, it will help you over the long term.

MR. DEMERJIAN: As far as I can tell, this is what you've got with the super sites. It does raise some questions about...actually, what's the final decision on how the chemical sites will operate.

MR. SCHEFFE: For the NAM sites, one out of three. We had put in the, in fact I wonder if we have to do some work, because it's in the regulation as one out of six. As a result of this work, we've decided to go with one out of three, at a minimum. It's

consistent with the improved program too, that's the other part of it.

MR. PIETARINEN: I wasn't talking about super sites. I was talking about...

MR. SCHEFFE: In general. Well, then the idea of the super sites would be transition and technology.

MR. PIETARINEN: You move that speciation network from every six days to every three days, Ken and I talked about this earlier, about this thing being sustainable over the 10 years. You might not be able to keep it going for that period of time.

MR. SCHEFFE: Exactly.

MR. PIETARINEN: Obviously, that's an issue.

MR. SCHEFFE: Yeah, it is.

MR. DEMERJIAN: You mean in terms of personnel and effort? Is that what you mean in terms of the magnitude of the effort?

MR. COOK: Are you talking about just the NAMS, one out of three.

MS. BYRD: Right, the 50, yeah, whatever, NAMS.

MR. SCHEFFE: Any site that is going to be used for a long term trend, whether at a NAMS site or whatever.

MS. BYRD: It effectively doubles in

price.

SPEAKER: But of the 300, 50 is the one in three. And the other 250 is to be declared later on.

MR. SCHEFFE: Absolutely. Whatever you want it to be. You're the master of your domain on those 250 sites.

SPEAKER: Ken, I wanted to come back to a point you made. I know it's getting late, but Ken, you made the point about we weren't that responsive in some of the other programs. The different part of this program too is that there's a prescriptive part and a very non prescriptive part. The non prescriptive part is bigger than the prescriptive part. So, that should help, in terms of allowing new technologies to get in, where I think in a lot of our monitoring programs, we're fairly restrictive.

MR. DEMERJIAN: But the non prescriptive part is still the issue of what are the incentives of the states to buy in and exercise those in a way that makes the most sense in terms of solving the problems, the scientific and the accountability and the user community.

MR. SCHEFFE: Sure. There's a lot of...

MR. DEMERJIAN: As opposed to taking the money and solving the program another way.

Which sort of happened with PAMS. You know, priorities were such that they had to postpone that and use the money some place else.

MS. BYRD: But this money can't, they have to solve another PM fine?

MR. SCHEFFE: Yeah.

MR. DEMERJIAN: All right. I think we should wrap up. This is more than was requested. Three hours to listen to this. I do want to thank you all for your contributions. We'll try to reflect them reasonably well in this summary. We'll try to come up with summary bullets of what we think is key, that's not a problem. I tell you what, we'll convene at 8:30 and we'll try to come up with a set of conclusions and thoughts.

MR. McNELIS: Is there going to be a summarization report?

MR. DEMERJIAN: This concept document, the idea is to augment that with any inputs that were developed in this workshop exercise. So, there will be another version of it, as I understand, the basis of which something is going to happen.

MR. SCHEFFE: Yeah, there will be a workshop report that the Steering Committee is responsible for. Ken is actually part of the Steering Committee and a number of others and that will give us general recommendations to start administering the

program. By that I mean writing contracts, cooperative agreements, those types of things. I'll probably talk a little bit about that tomorrow, in terms of those next steps kinds of things.

MR. DEMERJIAN: Thank you all for your attention.

(**WHEREUPON**, the Breakout Group Session was concluded at 5:15 p.m.)

CAPTION

The Breakout Group Session in the matter, on the date, and at the time and place set out on the title page hereof.

It was requested that the Breakout be taken by the reporter and that same be reduced to typewritten form.

EPA/NARSTO PM MEASUREMENT RESEARCH WORKSHOP

"Breakout Group; Accountability"

July 23, 1998

MR. DEMERJIAN: Some of the points we want to raise in the plenary in terms of the workshops or our work groups are the conclusions that they had, they had put together a kind of a matrix of questions, most of which didn't necessarily, weren't all that relevant to our task, but they are and they are not. I mean, it's obviously mostly aren't to the way a measurement should be made and what measurements should be, and what the frequency is, and there are some aspects of that that are relevant to our discussions, but they are probably not the driving factors for what our greatest interests in terms of the PM2.5 supersites are. So I was hoping this morning that they'd have a printer available, which they said that they would, and I would print out these break-out summaries, but we'll just have to do is speak to it.

What I'd like to do is go over those bullets, and then if people feel that there's particular items that I left out or something else that needs to be emphasized, I'll put it in, and then we'll, so that it can be summarized in the session this afternoon. What I have to start off with is that there seems to be a general consensus within this group that accountability

in a air quality management system is a reasonable thing to have, and that the PM2.5 standard actually offers an opportunity to build it in up front. Where historically we haven't been able to do that. We've always played catch-up, actually because a lot of the controls won't be considered for several years from now. It is possible with the time within the implementation plan, a process in which you could demonstrate, within the process you could identify aspects of accountability that you would track the performance of the controls and basically would be employment of this new network, hopefully capture those features in the air quality. So and then, there seems, I was asked to re-emphasize that accountability in the context that we're talking about it is related to the air quality management approach itself and not accountability to the supersites program per se. That is, we're not talking about when the supersites program is done, what are the accountable features that it should have in terms of reporting to OMB, or to the scientific community, or whatever. That's not, that's not what we're about. We're about this larger, big picture approach in terms of building it into the air quality management system. The other point is that the supersite's network, as we see it in support of the accountability paradigm is that, is that it's ability to augment and evaluate in tradition all the measurement

methods that are going to be part of the operational network. We're not necessarily saying that we think that the supersites program per se is going to be the network that will provide the grist for the accountability exercise, mainly because we don't think it's going to be out there long enough to serve in that role, since pretty much to do this kind of tracking progress you need to basically be operating over the term of the emission control program. It doesn't happen overnight, and actually this process is one that's supposed to continue throughout the whole implementation of the particular standard that you're involved in.

So to the extent that the design of the supersites is going to provide insight into parameters that are going to be important to a particulate chemical constituents that we think are going to be good tracers and targets to emission controls that are relevant to the PM2.5. That's where we see their contribution having the greatest impact on the accountability paradigm. What we did is, we discussed what were some of the, since current plans for any emission controls for PM2.5 won't be, I guess John said, would be considered until something like 2002 or beyond. What we did is we tried to identify all the emission control programs that were underway that would have some implications to PM2.5, and I think what we came up with is that we have Title 4, which is going to be impacting SO2 and NOX for

stationary sources. We have programs that are actually in place with regard to diesel, particulate emissions and in particular an activity that was introduced in '91, and there it looks like there might be some opportunities to track some impact of that program. We have the overall NOX BOC activities that are associated with oxidants and implications of those in terms of particulate, I'll talk about the second, but that's another area that goes with the ongoing programs, and if there is some implications in terms of particulates on those we'd like to see if there's a way to track those as well. Then there might be, there are examples of some special study or special emission controls or emission actions that are being taken within, within specific areas, cities, and one example that was brought up at our meeting was the fact that there is, in New York City there is a program to change the bus fleet to natural gas, and that certainly would be an area where we would like to see the perturbations of the result of that kind of action. So what are specific PM2.5 measurements that we would like to track, take advantage of with emission controls that are ultimately either in place or are going to be continuing over the next five years or so, or at least prior to the, any implementation of the PM2.5 controls that are going to occur as a result of the promulgation standard. Well, with regard to the Title 4 emissions, they are issues in

terms of resolving, we'd like to look at the trends in sulfates, nitrates, ammonium, ammonium and H plus, and in particular we'd like to also see if we can resolve any issues associated with the partitioning of sulfate and nitrate which there are some reasons to believe could vary as a result of that. Sulfate, if sulfate particulate is reduced there is potentially the possibility that nitrates will make up the difference, then they will start to increase, and whether that's a one to one or whether that partitioning is going to be all that relevant to the overall impact of the PM2.5 mass standard remains to be seen. But, that is one of the issues that we'd like to see resolved. So to the extent that, I mean, the speciation network is going to cover some of these things, but for example, it won't cover ammonia. It also may not cover some of the other anti-cations that you might want to have a handle on if you're going to try to get at this partitioning problem in terms of the nitrate and sulfate. But that would be one of the things that we would like to see if there's going to be any special work done in the supersites program that would augment the chemical speciation of the, that would give us their understanding of the SO2, of the sulfate nitrate partitioning. We would like to see that be considered.

The second area was related to PM organics and we talked about the implications of some of the

changes that might effect, for example, the diesel emission reduction changes that have occurred and what their impact would be on elemental carbon and semi-volatile organics. There are also issues in terms of VOC controls as a result of oxidant management strategies, and there it's much less clear about what those VOC controls with, what their impact might be on semi-volatile organics, but that would be probably where we would have expectations as well as things like reformulated gas and whether that has any implications in terms of organic particulates and semi-volitales. Unfortunately in terms of forming the gas, I think that ones kind of the cow's already out of the barn type of situation. Though if some area is right on the border of non-attainment they may ultimately bring in, in the formulated gas in the future and we might be able to see if there's any credidation as a result of that. The other area is in NOX control, which as I mentioned we have something going on in stationary sources with this, it's likely to be non-controlling for the mobile sources, what's the implications of that in terms of changing the whole NOY partitioning framework. As a matter of fact, both the DOC and NOX control programs could effect the partitioning of NOY, and that is they could either exasperate nitric acid formation, therefore presumably effecting the nitrate bound, or it's conceivable that some of those, it's not so conceivable,

but it is possible that some of the nitrogen, more of the nitrate could get tied up in organic material, and that organic material may or may not be in particulate form. Certainly nitration, a society issue again, but in the toxics area nitration of things like these polycycular aromatics are very important in terms of carcinogeneses, so the implications of that as well, and actually that hasn't been talked about very much here, but, the toxicity of PM2.5 particles. It could be an issue, or it could be a benefit in terms of the whole program that's being considered, and actually it is something that maybe is worth bringing up. I don't know what the linkage is between the air toxics program and the PM2.5, and Richard is not here. There's certainly a linkage there, and I actually haven't thought much about that, but that is an issue. So for example, the nitrated polycyclics are known to be really bad players, and what the implications of some of these actions would be on their reductions and a lot of them potentially are semi-
volatile, and again some of them are just out and out particulates. So they would be another factor that we would want to consider in terms of the organic fraction.

Then finally, the other area other measurement that we raised, even though it might not directly impact the total mass content of the PM2.5, but we suggested that this potential, it could be potential

changes in ultra-fine concentrations. The conjunction of control programs involving combustion modification processes. So any control program that's either changing the combustion process or it's fuel switching or substituting like this methane gas fleet of buses. That might change the mix of ultra-fines there. I guess that's just raising a flag, attention to the health community where there could be benefits of PM2.5, but at the same time there could be chances of ultra-fine, and that's something that might be important to look at, and if it turned out that down the road there were a health effects study that pointed to ultra-fines being a critical issue, that would obviously be one of the things that we would want to track in our accountability paradigm. So that would be another area that we would highlight. Then I think we had a lot of discussion about this, and unfortunately we didn't have a lot of health people in our group, but I think it's, we believe that there is a need for an inventory that will provide us with ongoing and planned air quality health effect studies. So that we could look at those and assess whether they can be incorporated into this paradigm. Find out for example if there are in place studies, like the one that I mentioned in New York City, which is the asthma emission study. If there are other studies like that around, compiling that information, and then finding out when that's going to be deliverable, when that

information will be available, and then see if we can tie that into certain perturbation that we expect to see in the environment as a result of some of these actions we've just talked about. We expect to see perturbation in certain PM2.5 activities as a result of Title 4's, as a result of diesel emission programs which has been ongoing, etcetera, etcetera. And then I guess to make a plea that somehow, I believe that there is an attempt to put an inventory together right now for health effects work. It just hasn't gotten too far, but I think there's still people that have not given up on it, and they're going to work on it. That needs to be put in place if we're going to take this process to it's final stage, which is to close the system in terms of showing benefits for implementing controls in terms of health benefits.

MR. DURRENBERGER: One thing I would point out, though is, I think one thing we need to do is get some parameters for the, to track, and then having it available on a more global scale than just...

MR. DEMERJIAN: In terms of health indicators, you mean?

MR. DURRENBERGER: Health indicators to track that can be tracked. What makes sense to do and you know, get that out of various areas of the country to show this, you know.

MR. DEMERJIAN: Well, should we

bring this up in the plenary as a charge to the health group, that they provide potential indicators?

MR. DURRENBERGER: That's what I'm suggesting that they provide some kind of an indicator system for each, when it's tracked to see, I mean, when you start and continue tracking it to see the correlation between those and the PM5.

MR. FEGLEY: Are we just talking about suggesting that epidemiological studies are done or something more than that?

MR. DEMERJIAN: No, I guess I'm suggesting, I'm not even sure if I'm suggesting, I'm assuming epidemiology studies, I'm effect studies, I'm assuming they are happening. The question is whether the metric, the indicators they are using could be correlated or could be used to view potential changes that we anticipate to be happening in PM2.5 over the next decade.

MR. DURRENBERGER: In other words there are some metrics that could be tracked that would be good indicators of the effect of the PM5. They could be routine tracked and say, okay, we've got the reduction of PM5 and these health indicators, where do they go in the correlation.

MR. FEGLEY: But again, that just sounds like epidemiology to me.

MR. SOMERS: Well maybe it's like

you have a big catalog and it has several items in it and you don't know which items are going to be valuable or not, and what you do is, you look at the things that likely are culprits and try to get a certain amount of tracking information. Like is it organic setting or could it be like sulfates, the ultra-fines, or like that, transition that whole, like a list of several things to say well, nothings really been indicted yet, so it's obviously not worth it to have a tremendous program to get information on all of these, but you know, these are suspected to health problems and so we should, in our supersites stuff, pay some attention to, you know, tracking these with time.

MR. DURRENBERGER: If you can correlate those, that tracking with some health indicators, then that might draw some information. It might be with some other kind of study, but we may be able to draw something out of that, which one of these are the critical one.

MR. FEGLEY: I guess the problem I have with this is if you don't do a carefully designed epidemiological study, you're just correlating changes in PM2.5 or whatever metric of per particulates you have with some disease when the things that cause disease, the list is a mile long. You know, you're going to get, any analysis like that is just going to get shot out of the water. Say I didn't consider XYZ and NBC.

MR. DEMERJIAN: It's interesting, in that I have no idea, obviously I'm not an epidemiologist, but this asthma study that's being planned in New York City, they got, they've obviously taken two control groups that they kind of get exposed, actually it's not true, the exposure is different as well. I mean one's in Manhattan, and one's in South Bronx, and they're going to, for a year they're going to track fairly detailed PM and chemical compositions, though it's not going to be as detailed as what these supersites are going to be, but they're going to track that, and then they're going to track emergency room visits as well as other, I don't know how they're going to do this, but one of the issues I know in the South Bronx is that is in more socio-economic areas there are more low level standard of living. They have a tendency to use emergency rooms all the time, and I guess the last time they did something like this, they found out that they had no visits from this one rather affluent area, but it turns out they were all going to their doctors, and they weren't going to the emergency rooms, and so they seem to have gotten a handle on that which, and they're going to try to deal with that. But assuming, let's just assume that that study gets done, and they create a metric, a connection between PM, they claim to get a connection between this PM2.5 and these hospital admissions. If

that was, if that could stand the test of scientific scrutinity, then the idea would be, can you have in place a program which continues to monitor these hospital admissions for asthmatics, for asthmatic conditions, and then build that into this process where as we move towards incremental changes in the long term, to see if they correlate with incremental changes in asthma conditions. And I'm somewhat skeptical in that I know that there's a variety of compounding factors that effect asthma patients, so I have no idea this is going to be a very useful exercise at all.

MR. FEGLEY: I would think in the study, they probably don't look at cigarette smoking, they probably don't look at the cleanliness of the homes, and you know...

MR. DEMERJIAN: Yeah, it's all kinds of stuff, and the exposure levels at two, are actually different because in the poor area they have the windows open, for one they don't have air conditioning and it goes on and on.

MR. FEGLEY: Right, right, and we're not going to be tracking that all the time, I wouldn't think.

MR. DEMERJIAN: No.

MR. FEGLEY: So I would think it, well I mean...

MR. DEMERJIAN: There are ways to

look at some of those things. I mean, you could, even though you're, I mean obviously temperature's going to have a huge impact on all this in terms of exposure and all that.

MR. DURRENBERGER: Well we can't just throw our hands up and say we can't do anything and not do anything. I'm saying is there something that we can narrow down the information and track. That's what we're saying. Is there something...

SPEAKER: Right.

MR. DURRENBERGER: Is there something there that you...

MR. FEGLEY: I think that's fine. I just think you're walking pretty thin ice, and you shouldn't expect too much out of it.

MR. DURRENBERGER: Well no, we're not. We're just saying, can we start, can we start that. Can we start looking at it? Can we get people thinking about that, and there may not be, something could be there, but after all if there is, if we're doing this for health, you ought to be able to track it and see if there is a response.

MR. COOK: Are we talking about the air quality side and about the health side of this. There's the supersite part which means that you have to monitor the right thing.

MR. DURRENBERGER: That's

correct.

MR. COOK: Is that what we're talking about or we are talking about trying to suggest to somebody that they felt the long term method of extracting hospital, emergency room admissions from the health community. Those are, that would require potentially setting up a whole new set of recording outlines for the hospitals.

MR. DEMERJIAN: You know, I don't want to get into the discussion that we're suggesting that that's how this PM supersites money should be used. I mean, that's, that doesn't make any sense. I guess all I'm trying to bring out is that in order for this to ultimately close, this system, there has to be some way to monitor effects, whether they're health, or ecological, or welfare, and actually it turns out that the welfare is somewhat doable with PM, I mean, in some areas. You can look at this ... pyramid and you can show, you can show changes in that, and that's, that is measurable. The effects, I think there are some potentials, and there is a network within EPA that ultimately is close to getting a handle on effects. The, what is it, EMAP, right, E-M-A-P. I don't know if that's still alive. Is that still alive, which is an ecological network.

MS. BYRD: I've heard different reports on...

MR. DEMERJIAN: It got, it got damaged by the NRC, it got handled by the NRC. It got handled by the NRC as being basically too broad and as trying to do too much. But the design behind it was to actually establish baselines that certainly what we might view as susceptible ecological systems and then monitor their change as a result of insults from...

MR. MCKAY: They're still going, Ken, EMAPS.

MR. FEGLEY: But in terms of concrete suggestions that, I know that HHS has several disease surveillance programs that could be tied into. Particularly in the area of asthma where it could be, possibly to keep up the surveillance of asthma across the country. HMOs as we know are getting bigger and bigger, and they're a huge source of data for these kinds of things that we can tap into, so there are some concrete, I mean, you know, I mean, again, not with this money perhaps, but in terms of being a target of opportunity.

MR. DEMERJIAN: Yeah, the HMO thing came up in another meeting I was at last week. Someone suggested that some of these really big ones, matter of fact the one in California...

MR. FEGLEY: Kaiser.

MR. DEMERJIAN: Kaiser. They were saying that that might be a really...

MR. FEGLEY: People have used that before, yeah. They're...

MR. HOMOLYA: What we're talking about is a way to make statements to, and we need to reconcile the outcome from some of these relatively short term studies, this asthma study in New York for example, with sort of the tact that the large monitoring, long term monitoring programs are heading. For example, if there's an association with asthma admissions in New York with a characteristic or a hoop of characteristics that are part of the monitoring that's going to go on there, that's the aerosol monitoring, that would make a strong statement to reconcile that outcome if it is indeed significant in the context of what's being measured and why, and how much is being measured and monitored nationally over a longer term, and that, that we implement those markers, if there are any markers, deliberately make a move to implement those markers in the monitoring network. You know, to supplement it is appropriate. Maybe it's gone through some research under, under the supersite program, you know, to take advantage of those, those individual studies.

MR. DEMERJIAN: Yeah. The interesting thing, from what I can tell, I've just had a chance to really review this asthma program, but the measurements that they're going to make aren't much

more sophisticated than what would be in the typical chemical speciation network, so it's not like they're going to uncover, well, I don't know, I guess they are, the one thing they are doing is that they're looking at smogs, and all those kinds of indicator type things that are, those kinds of sources. I don't think typically we're doing that here, in the PM network, but they'll be looking at those factors. But other than that, I think the chemistry is equal to or less than what is currently being anticipated in the speciation network. I don't know if we'll get a lot of insight beyond those parameters.

MR. CLINE: I guess as a non-scientists just and not understanding all the literature, and just listening to this, the other group will probably understand it. What I've heard a lot of this conversation today, is going along the lines of, maybe we can gain something from health studies in terms of learning to tie what they're doing with what we're doing and learning more about what's going on out there. But, in terms of the stated objectives that we've got in our write-up, it states here that one of the objectives is for us in fact, to support those studies rather than reduce the, supersites. It says here, development, monitoring data and samples to support the health and exposure studies. It sounds to me like we're saying we would go in an opposite direction and if you are, we

may it owe it back to the group to say we don't agree with it.

MR. DEMERJIAN: Well, I'm not sure if we're actually going in the opposite direction. All we're saying is that the, that we don't see at this point the health effects being a factor that we can bring into this accountability paradigm because of the long term nature of what has to be done. I think this inventory of identifying what health effects are going on is obviously a starting point if you're going to address what the objective there is, which is supposedly how are the supersites going to augment those studies. I mean obviously if they don't know where those studies are that's going to be a bit of a problem to augment anything. I'm saying that if those studies were identified, if someone identified a long term study that's going to go on for the next fifteen years, that's going to track some health indicator and air quality, we would definitely want to know that, because that's one of the things that we would quickly inventory into our process.

MR. WEST: Just a comment on accountability. It seems the standard space on certain health studies that have already taken place or are going to take place over the next year, and it seems to be an easy way to document accountability is just to redo those exact same health studies to be used in the

future as to the, that seems to be the most obvious thing to do. I don't understand why, they may have some new studies taking place right now. So basically they just go back and repeat the same studies again.

MR. DEMERJIAN: Some people argue that we should have a system in place that continuously is monitoring this. The Canadian system actually is it, because the Canadian system uses objectives rather than standards. Part of what they're trying to do in their process is to track not only the changes in air quality to see if it's approaching their objectives, but also tracking the effects, the health indicator effects, the health impacts and seeing if those also move in the same direction.

MR. WEST: That's what I'm saying. The baseline is being, has, is established, will be established by 2000. We're basing all our decisions on...control, that's your baseline.

MR. DEMERJIAN: Well, but the problem is the asthma, or as I understand has gone up dramatically in the past 20 years, and if you look at all the health, all the air quality indicators, there's no reason that you should be able to correlate, I mean it's...

MR. FEGLEY: That's not what's causing it.

MR. DEMERJIAN: No, I know it's not.

I'm just saying that if you use that argument, that you proclaim there's been a baseline, you know, it's a baselines of asthma.

MR. WEST: I'm just talking about the standard setting, process that we just went through CASAC did its studies and recommended that is a standard based on some, what are those studies worth, city studies, whatever, so a baseline is sort of already established that now we can go forward and hold people accountable and see if those studies improve. That seems fairly simple to me.

MR. DURRENBERGER: I think that's fine if you can sort out cause and effects.

MR. FEGLEY: The hazard here, I think we should say something like this. I think we should also say that we understand that we're talking about a fairly weak signal, and that if we don't see anything, it doesn't mean that there isn't anything. It just means that it's a very weak signal.

MR. DURRENBERGER: Well, the thing you have to be careful about is drawing a cause and effect relationship statistically from that, and that you may not be able to see it with data that's collected, and that's the danger of doing this, and that's what one has to be very careful about, even doing the studies you're talking about, it might be one here, and one here, and one there. You know, if you don't, you may

have points on the curve that may not establish what one thing is, and you may have some curvations in there that are not taken into account. That's the danger of doing that approach. So what really needs to happen is a combination of all of these, really, to say is there something in tracking to me, and can we have these special studies on the way, and see if we can draw some kind of relationship. I got to tell you that, you know, we're going to have to show that there's a cause and effect relationship or people are not going to spend, you're not just going to have people spending their money, and changing their lifestyles, and doing things like...

MR. FEGLEY: I think that's absolutely right. I think the idea that we're going to find that cause and effect relationship through some kind of long term surveillance and monitoring without a collection of a lot of other variables in a, sort of formal epidemiological study. I mean, the formal epidemiological study is where we're going to show that.

MR. DURRENBERGER: I agree with that. I'm just saying, is there something that we can track that would, that would help.

MR. FEGLEY: Yeah. No, I understand.

MR. DEMERJIAN: You believe in

order to tweak out the signal of the impact of the air quality, it's really going to take a full blown epidemiology type of study. I mean, I think you might be right.

MR. FEGLEY: Yeah, unless we find some, some marker of disease that correlates really well with PM and not with anything else, but I'd be surprised when that happens.

MR. DURRENBERGER: Well, I'll give you an example. At the AWA meeting they had, somebody had a paper about living in Dallas, and they said they saw no correlation, even though they'd done all the studies between PM high levels and health effects.

MR. VANDENBERG: If they had looked at a specific component of PM, they might have come to a completely different...

MR. DURRENBERGER: That's exactly right.

MR. VANDENBERG: That's part of chemical speciation data or supersite's kind of data that gives you the ability to tease this...

MR. DURRENBERGER: That's correct, and then the other thing they didn't do, didn't do a very good job of looking at the effects of people. They saw, they saw the response to ozone, and you know, how do you, they were looking at gas, and you

know, ozone and heater correlated, and how do you separate those out. I, that was the question I had. These are so called professionals that we have do this, I don't know anything about it.

MR. FEGLEY: Well, they got to be good studies, you know. I'm not saying they're not, that's what the whole peer review thing's about, you know.

MR. DURRENBERGER: And I'm just pointing out that that was one that was reported out, and it didn't look, I don't know, there was some stuff there...

MR. FEGLEY: Well, not every study's going to show anything.

MR. DURRENBERGER: That's right.

MR. FEGLEY: Even if it is possible.

MR. DEMERJIAN: The final thing I had was just to send a plea out to the people that are designing the, or the measurements people that are going to be putting out the cabaret of techniques and various measurement platforms to be considered in the supersites, that they step back and think about how those measurements might be tied into the use and tracking various emission impacts and, so that they have this in the back of their mind, that some of these measurements, if they bore out to be successful could be used to, and actually be the physician into the

operation lab work and influence the, it's utility through this emissions...and progress.

MR. PIETARINEN: Yeah, just, I guess this is along the same line I was thinking earlier in the discussion and from the data we showed yesterday when were looking at sulfates and nitrates and saying we had some problems with nitrate data that's selected and looking at these, and said some of these controls that we're talking about are things that are already ongoing, and an effort hasn't started yet. Should part of what supersites looks at is to see if there's some relation between what we're putting in place, networks that already exist to see if we can track the programs that are already started. Sulfate, for example, they've been improving that data for years. Is that study improved data going to correlate the data you get from the speciation sites that we continue, continue that trend information right on through. The same thing with nitrate, that's problematic in the way they're doing it and improve, and see if there's something we can do with the supersites program to look at that issue so that we can make tabs on the record of whether or not there's been a shift in the change over time. You have to prove out there is NEP out there, no reintoxins, in monitoring the program, a gas network, there's a whole list of programs that are collecting data the PAMS data that might be related. Is there something to interrelate

between those supersites method...

MR. DEMERJIAN: I guess my opinion is absolutely, that all of that data needs to be cross compared. I think that, I mean, EPA's already kind of put and proved it's part of it's, what it uses as the backbone of the PM2.5. I think that the only issue that you'll run into with regard to, I don't think there'll be an issue with the sulfates. I think the sulfates will kind of fare out across all the networks. I think the nitrates will be an issue, and that might be either a combination of measurement artifacts or just where these stations are. I mean, the improved stations are sitting out in various, typically world environments, and a lot of, most of these sites that we're talking about are going to be sitting in environments that are pertinent, but there will be at least some of the PM2.5 network that will be in rural sites. So you'll be able to inter-compare if there's issues in terms of analytical procedures that should be at least some, in the comparison that will come out of that, and you well know Rich as we kind of touched upon this, but I'm not sure if we heard the final answer, is do you think that there's any chance of their being a rural PM2.5 supersite?

MR. SCHEFFE: There will be. The idea again, the idea here is that this is a, trying to merge the health communities and research science communities. There's a strong likelihood that

supersites are going to be in populated areas for the most part. The idea of doing this to a NARSTO mechanism, this is a NARSTO meeting, is that there will be other major field programs established that will be super-like in appearance. SCISSAP is an example, SCISSAP is an example when you get a grant, the SCISSAP program is really, will have a relative plan, as SOS has always had a relative plan. I've had discussions with NARSTO members, Mike Albro and Jeff West about their utilities supporting supersite type sites in sort of the more regional rural environments, and these supersites in the city to complement their sites, so I think that's how it will happen. I think it would then be very difficult because one of the big jobs we have here is trying to meld the health community and the atmospheric science communities together. It's very hard for us to set to do that and put a lot of the resources into a rural site. I'd love to see a rural site as a supersite, and I think it's incumbent upon us to make sure that that kind of leveraging in the other sites complements the work that's been done and vice versa.

MR. DURRENBERGER: SCISSAP is going to have that, and I think our states going to have three or four rural sites like that will be equivalent to have something like that. Maybe not for a long time period, SCISSAP two to three years worth of data, so I think there will be some of that.

MR. MCKAY: One of the, one of the areas we're thinking about is in a place... It's north of Toronto, about 80 kilometers north of Toronto, and that's one of the areas that, you know, working with EPA here and the supersites, and in terms of putting something, you know, in there.

MR. SCHEFFE: Yeah, and the other, the other real responsibility is part of the reason for having this workshop, I mean, it's going to be very interesting to see what people come up with in terms of there are these forms that all these groups are filling out in terms of where do you want these mechanisms, and we'll have to weigh those and see if there is sort of a consensus opinion that one of these supersites ought to be dedicated to a rural location, and that's a possibility, and you know, I don't want to give the impression that we've decided it's going to be here or there. If this group, if this workgroup that's been established here, decides whoever makes that recommendation, we would follow through on that.

MR. DURRENBERGER: Well, wouldn't that be one of the things that could come out of our accountability tracking is to look at the different phases through SCISSAP, look at their results, look at some of the results from these other things and say well does this show that there's a significant difference and therefore that warrants looking into having one of these

sites in a rural location, or being continued on, can the funding be switched from SCISSAP to some other, some other approach. Seems like to me that, that's one thing you ought to look at is the, but I think it's an issue that perhaps ought to be...

MR. SCHEFFE: Well, the whole issue of coordination or synchronization in terms of this issue is real important. I think people, this is not an entity to itself, the supersites program. It really has, and Charlie to answer your question with the difference in instruments with respect to nitrate, that's one of the things that the supersites program is going to have to look directly at, and I can't imagine that not happening, I can't imagine that there will not be nitrate modulars set up with other types of speciation standards as well as the Federal Records Methods to try to discern the differences in what nitrate is collectible across all of the supersites, I can't imagine that not happening.

MR. DURRENBERGER: Well, SCISSAP is going to be doing that.

MR. SCHEFFE: Sure.

MR. DURRENBERGER: Because they're going to be doing a bunch of stuff like that in every site, so I think we'll get some measurement there, but maybe not as long term as what we expect it be at these sites. That's why I say that we should mine that information to say well, that makes sense to use on the

supersites.

MR. SCHEFFE: Yeah, and there's the, you always this timing issue of the, of what comes first again, more or less, and that's going to be the tricky thing, and I think in the end, the ideal here is that we have people heavily involved in SCISSAP and these other activities and then we're collectively we're doing some design and planning, and it's not an easy task to do that collectively. That kind of coordination.

MR. DEMERJIAN: Any other items that you think needs to be included in this summary list?

MR. COOK: Are we reconvening at 9:30 or 10:00?

MR. DURRENBERGER: The schedule I handed out said 9:30, of course, it seems like we may have to reconfigure some rooms down there or do something down there.

MR. DEMERJIAN: I think we can adjourn, and thank you again, and see you downstairs.

(**WHEREUPON**, the Breakout Group Session was concluded.)

C A P T I O N

The Breakout Group Session in the matter, on the date, and at the time and place set out on the title

page hereof.

It was requested that the Breakout be taken by the reporter and that same be reduced to typewritten form.